THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XXII. No. 550.] LONDON, OCTOBER 21, 1873. [25TH YEAR.] Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
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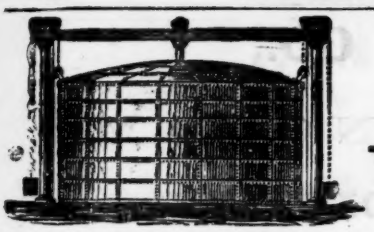

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Which are now so extensively used.

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Plans of gas-works are carefully prepared, and every improvement which long practical experience can give is introduced into works entrusted to the care of the Advertisers.

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MESSRS. NEWTON, CHAMBERS, & CO.,

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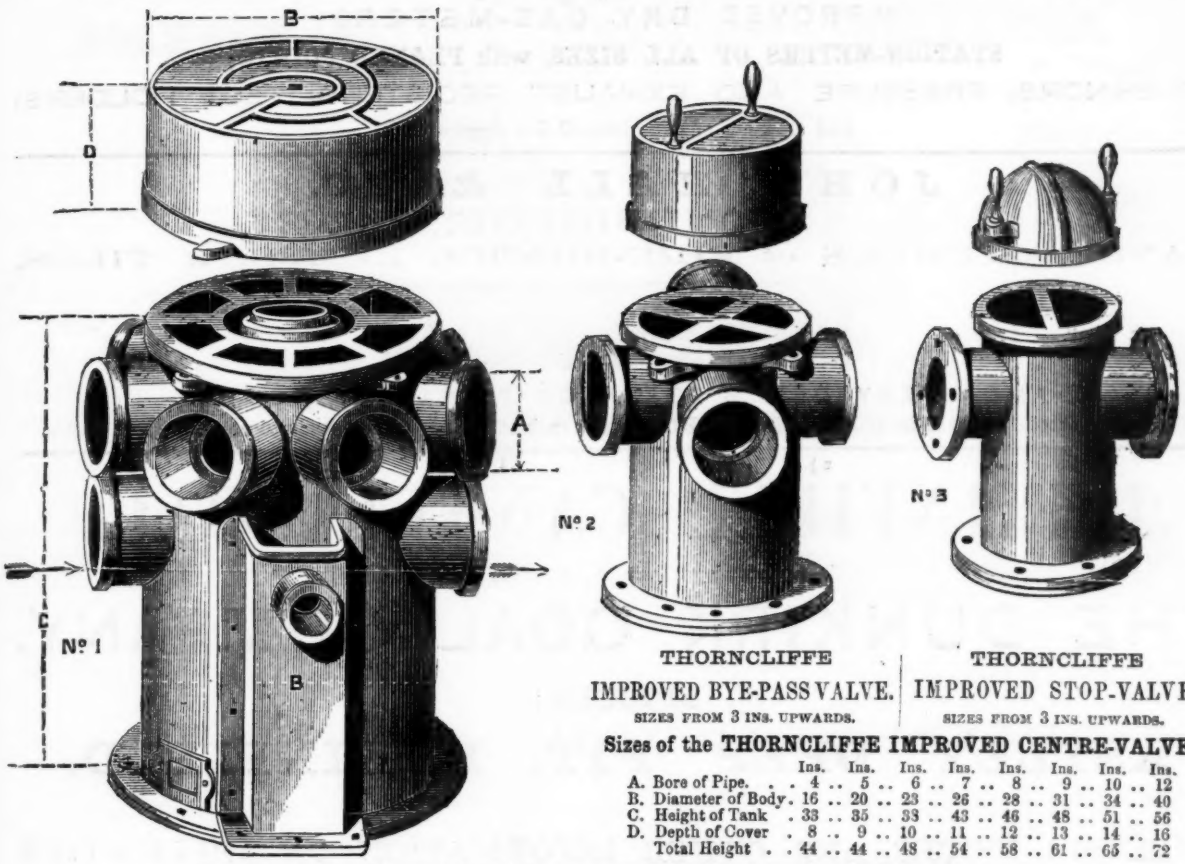

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SIZES FROM 3 INS. UPWARDS.

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SIZES FROM 3 INS. UPWARDS.

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B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	33 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

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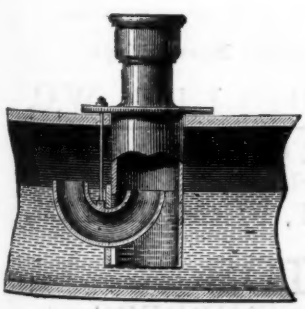

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These Patent Self-Acting Dip-Pipes are rapidly coming into general use by gas companies. By their use the whole of the pressure caused by the old kind of Dip-Pipes is entirely removed, therefore the yield of gas per ton of coal is considerably increased. They also act as a perfect safeguard against the deposit of carbon (or scurf) inside the retorts.

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IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

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STATION-METERS OF ALL SIZES, with PLANED JOINTS;

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Combining most recent improvements in principle and manufacture; upwards of 200,000 already in work, giving highest satisfaction.
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WITH

HOLMAN'S PATENT ECCENTRIC FASTENINGS.

OVER 7000 IN USE.

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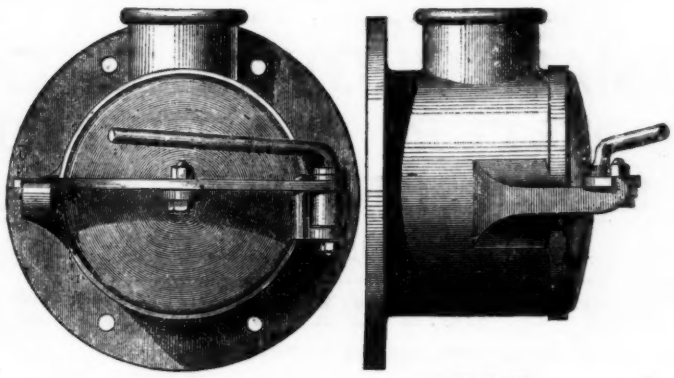
LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



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ECONOMICAL.

DURABLE

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

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" London Gaslight Company.
" Independent Gaslight Company.
" Phœnix Gaslight Company.
" South Metropolitan Gaslight Company.
" West Ham Gas Company.
" Imperial Gaslight Company.

The Gas-Works, Royal Arsenal, Woolwich.
" Alliance and Dublin Gas-Works.
" Edinburgh Gas-Works.
" Manchester Corporation Gas-Works.
" Salford Corporation Gas-Works.
" Rochdale Corporation Gas-Works.
" Liverpool United Gas-Works.
" Birkenhead Gas-Works.
" Birmingham Gas-Works.

The Nottingham Gas-Works.
" Newcastle-on-Tyne Gas-Works.
" Carmarthen Gas-Works.
" Merthyr Tydfil Gas-Works.
" Ystrad Gas-Works.
" St. Alban's Gas-Works.
" Over Darwen Gas-Works.
" Aylesbury Gas-Works.
" Cardiff Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

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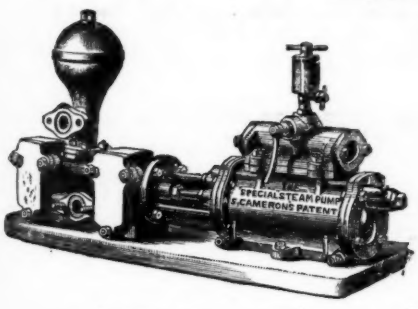
Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly, (Signed) F. J. EVANS.



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OCCUPIES VERY LITTLE SPACE.

CAN BE PLACED CLOSE TO ITS WORK, AT ANY DISTANCE FROM THE BOILER,

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" London " 1
" Phœnix " 6
" South Metropolitan 1
" Western " 1
" Alliance & Dublin Conrs. 9
Aldershot 1
Altona 1
Arbroath 1
Aylesbury 3
Banbury 1
Barnet 1
Belfast 2
Bolton 2
Boston 1
Bradford 1
Brentford 1
Brighton 1
Bristol 2
British Gas, Hull 1
" Norwich 1
Burnley 2
Burslem and Tunstall 1
Bury St. Edmund's 1
Cagliari 1
Cork 1
Darlington 2
Dewsbury and Batley 1
Doncaster 1
Dunstable 1
Eastbourne 1
Falmouth 1
Forfar 1
Guernsey 1
Henley-on-Thames 1
Ipswich 3
Jersey 1
Kingston-on-Hull 2
Kingston-on-Thames 3
Leeds 1
Lewes 3
Londonderry 1
Louth 1
Maidstone 1
Middlesborough 2
Newcastle and Gateshead 1
Northampton 2
Ogley Hay and Brownhills 1
Oxford 1
Plymouth 1
Portsea Island 2
Preston 1
Reading 2
Richmond 6
Rio de Janerio 1
Rochdale 1
Rotherham 1
Salford 6
St. Alban's 1
St. Helen's 2
Shipley 1
Southport 2
Stockton 1
Sutton Southcote & Drypool 2
Tottenham and Edmonton 1
Tunbridge 1
Tynemouth 1
Wandsworth 1
Windsor 1

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Paris, 1867.

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7th, May be fixed either above or below the level of the Lights;
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WATER METERS.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, OCTOBER 21, 1873.

Notes upon Passing Events.

When we consider what miners were a very few years ago, and what they still are in such districts as the Black Country of Staffordshire, it is certainly an extraordinary advance to find them organizing themselves into a deliberative assembly, such as that which has just been meeting in Bristol, under the presidency of a working miner, a highly self-educated man. Some of their expectations are visionary, some of their demands are unreasonable; but to read their discussions and to follow their debates, after those of the Internationals at Geneva, is like moving from the poisonous atmosphere of the West Coast of Africa to the mild and temperate regions of the Mediterranean. Thorough business-like calm characterizes the whole proceedings, which may favourably compare with those of many Chambers of Commerce, while it throws completely into the shade the pointless platitudes of the Chambers of Agriculture. Take, for instance, the following extract from Mr. Halliday's address on courts of *conciliation and arbitration*:—

The president observed that the committee considered the next subject upon the programme, "the consideration of conciliation and arbitration courts, and how to get them established in mining districts," one of the most important which the conference would be called upon to deal with. There was scarcely a week passed by but there were questions arising in the various districts of that federation which directly tended to injure both capital and labour. Strikes and lock-outs were injurious not only to employers and to workmen, but to the public as well; and if they could find anything that would assist them in averting those fearful occurrences, it would be a benefit to the country at large. Conciliation, as they were aware, meant that both parties should meet together, talk over their differences in a conciliatory spirit, each side giving and taking a little, and by that means trying to settle any dispute which might arise between them, and thus preventing strikes, which were so disastrous to the country at large. There were places in the country where rules had been drawn up under which masters and men had agreed to settle their differences upon the principle of arbitration, by which, if they could not agree between themselves, they should refer the question in dispute to an independent party, who should hear evidence upon both sides. He was pleased to tell them that not only had the principle of conciliation and arbitration been adopted in labour apart from mining industry, but to some extent in mining districts. The counties of Northumberland and Durham had adopted arbitration in dealing with matters between the miners and their employers, and the step there taken had been fraught with a great amount of good to the people concerned, and, if he mistook not, a similar proposition had been advanced by the masters and accepted by the men of West Yorkshire. He thought it would be well for that conference to consider what would be the best means of getting conciliation and arbitration established in every district, so that such a state of things as occurred in 1871, and again in the commencement of the present year in Wales, might be prevented. If both parties, the buyer and the seller of labour, were only desirous of doing that which was reasonable, surely reason ought to be able to settle matters in dispute.

How disgusted would a Parisian Communist be with such milk-and-water sentiments. Take, again, the remarks on technical education, a subject on which a tremendous lot of nonsense has lately been talked, the leading idea of a great many talkers being another school at South Kensington, or something of that kind, where young men of the white-handed class should resort to be taught by lectures after the plan, but not nearly so practical, as that by which Mr. Buckmaster (not a cook) taught cookery. Technical education to the working classes, to be of any use, must be planted in the midst of their works. Robert Stephenson used to say, and he spoke from practical experience, that it "was ten times more easy to teach a miner the "science that will be of use to him, than to teach a professor as much "mining as will make him of any use to miners." The Germans, in their metallurgical colleges founded in the mining districts, seem to have partly solved the problem.

The president went on to dilate upon the advantages of technical education in mining, in the getting of coal, the getting of ironstone, and the getting of metals generally, and that the youth of the mining districts should be brought up to understand mining in all its departments, not only practically but scientifically. There were many good works to be obtained upon that question, but what was contemplated by the committee was that as they had a very good organization they should endeavour to get a school of their own where the youths of miners only might be educated, not only in the practical working, but in the theory of mining, so that they might undertake the management of mines, and in some instances rise up to be mining engineers. He thought, as a practical miner, that a good deal had yet to be learnt in the cutting of coal—how, for instance, to get a larger proportion of lumps. Present mining resulted generally in getting two tons of slack coal for every ton of lump coal, and if they could reverse that it would be a step in the right direction; and if cutting machines were brought more generally into operation to do the hard work of mining, he did not know that any of them would complain.

Mr. Halliday did not run off in the usual direction with a claim for assistance from the Government, but proceeded to suggest a self-supporting system, which the Government would fairly be called on to supplement.

If they could see their way clear by their own subscriptions to establish a mining school, they might effect a great good for the mining population generally. If their 100,000 members were to put down 1s. a head, they would be able to realize £5000, or if they only gave 3d. per member, that small sum would give them £1250, which would go far towards providing gentlemen of high scientific attainments to teach the youths attending such a school.

Compare this straightforward and rational scheme with the cheese-paring proposals by the Livery Companies of the City of London, for manufacturing popularity and protecting their vast and vilely wasted revenues by a series of paltry prizes. One Livery Company, which annually expends nearly £10,000 a year in fees to the members of its courts, luncheons, dinners, and banquets, has offered, according to paragraphs industriously circulated, "the munificent sum of one "hundred guineas in prizes." Another great company, after building a new staircase at a cost of £30,000, has furnished it with a new carpet at a cost of £1000! And these wicked wastes of trust funds take place in a city where subscriptions are urgently required for a convalescent hospital; where the Guildhall Library, just opened on a small scale, requires at least £10,000 and a £1000 a year to furnish it with books; and where, while the farce of the Gresham Lectures is perpetuated, there is no college of physical science at all nearer than University College, and none open in the evening to the superior class of foremen mechanics nearer than Piccadilly.

It looks as if this African Expedition, for teaching the King of Ashantee reason, at a cost of something like a penny in the pound of income-tax, is to teach us a good many useful things. In the first place the negrophilists, who put down the British Slave Trade and led the way in emancipating the slave in English-speaking countries, have given up their supervision when there was plenty for them to do. All our African settlements are failures, because we make proper use neither of despotism nor of education. Despotism ought to have made the protected blacks at Cape Coast Castle work—compelled them to execute sanitary arrangements of the first necessity, not elaborate contrivances like those which even our villagers cannot use, but such as that wise sanitarian Moses enforced on the Hebrews in the wilderness. Quasshee ought also to have been used in constructing aqueducts, which would have secured a constant supply of pure water from the not very distant hills. But, then, the reaction from the barbarous cruelty of our ancestors has produced a ridiculous dislike to compelling black men to do what is good for them if they object, but which they are quite sure not to

do. Most likely any vigorous governor who had attempted to interfere with the ordinary habits and customs of Cape Coast Castle, before this last inglorious war, would have had a hard time of it in the House of Commons, at the hands of the Aborigines Protection Society. The Earl of Derby's pithy sentence, "We have enough black men on our hands, and want no more," will find an echo all over the kingdom. According to all accounts, the War Office and the military engineers are repeating their ancient blunders—sending coals to Newcastle, in the shape of rice, and poisonous condiments, and in the shape of salt beef and pork; as if the mangrove swamps and fœtid water would not decimate our white soldiers quickly enough. Then there is the latest plaything of the military engineers—a railroad and a traction engine. A traction engine in a country with no roads—a railroad of wide gauge to go from a surf-bound coast to nowhere in particular!—that, too, at a time when two-foot-six gauge railroads are familiar to every engineer—if, which the most experienced Africans doubt, a railroad can do anything for our army that a few planks would not do better. And these are the class of gentlemen, working, regardless of expense, to whom the *Spectator*, the *Echo*, and a few more highly intellectual journals desire to transfer the working of our railroad system.

Recent decision has established what was pretty certain before—viz., that the Postmaster-General is no more answerable for mistakes about telegrams than for the loss of registered letters—a pleasant prospect whenever Mr. Scudamore succeeds in getting hold of the profit and management of luggage.

Italy, as we have mentioned on a previous occasion, is one of the countries suffering under the incubus of a class of highly educated and thoroughly unpractical engineers. The modern *régime* of the rivers Arno, at Florence, and Tiber, at Rome, is truly painful to contemplate; dry, disgusting ditches in the summer months, swollen with turbid, wasteful waters in the time when snow melts and rain falls. The mountain forests, that nourished perennial springs and held up the snows and the rains, have been cleared before the thoughtless, relentless peasant's axe, and the soil has followed the waters—barrenness above, barrenness below, where the winter rushes of water drive away alluvial soil, and heap up barren mounds of sand. The remedy suggested by an intelligent correspondent of *The Times* is the formation of artificial lakes in the upper region of the Alpine and Apennine valleys, in which the surplus waters of the wet season might be impounded and draughted out in the dry. Under much greater difficulties this has been effected in the semi-tropical climate of Australian Victoria. But the dishonest behaviour of the Italians in the Cavour Canal business has discouraged foreign capital, and any plans suggested by an English engineer would receive every possible opposition from the elegant, eloquent, accomplished gentlemen who make such beautiful plans, know all about Hiero of Syracuse and Archimedes, and nothing of the history of engineering since Watt's steam-engine revolutionized the mining of Cornwall.

The *doctrinaire* school of Social Science are fond of quoting Prussia as a country where public business is managed with an exactness unknown to the private enterprise Philistines of this country. A story comes to us of Prussian railway management from an unfortunate Englishman who tried to send a truckload of furniture from Coblentz to Wiesbaden. The furniture did not arrive. He applies to the railway authorities—no information; to Coblentz, where a friend applies—"Know nothing." At the end of ten days he discovers indirectly that his furniture has all been smashed up in a railway collision. Another application to station-master—same answer, "No information;" and we may add, no redress. It is astonishing how pleasant things may be made to appear until a revolution breaks out. No appeals are allowed in newspapers, and no compensation paid by Government for destruction.

Railway accidents will always bear a certain proportion to the number of cross lines and the pace. If we were to adopt the French system of *grande and petite vitesse*, take a week to deliver the goods we collect and deliver in twelve hours—if we reduced our express trains to 25 miles an hour, and our passenger trains by half, so that every carriage should be cramfull—the number of accidents would diminish, and the British public would rise in rebellion. If the doors of stations were closed, after the continental fashion, a quarter of an hour before the train started, and all passengers were placed in rooms of detention, according to their class, while the baggage was all deliberately weighed, so that the guards could, at their leisure, pick out the trunks and bags worth robbing, as is the custom on the Belgian, Cologne, Swiss, and Italian lines, the companies would be saved a good deal of trouble and expense. But there certainly are some reforms which it is quite amazing that our railway managers do not introduce. If we want to take a monthly seaside family ticket, or even a single ticket in the summer season, it may be obtained either at Gaze's office in the Strand or Cook's in Fleet Street; but if a ticket is required for any place not in the excursionist list, we must crush up to the ticket office in the railway station. Why should not an officer at each principal railway station be provided with a book of tickets, duly marked with the starting time of each train, and supply all the passengers as they arrive, without waiting for that crushing "ten minutes" before the train starts. There is another obvious improvement—"a change and "inquiry office." "What is my fare?"—"One pound fifteen "shillings." The inquirer obtains change for a note or a sovereign, and presents the exact sum required to the clerk, who delivers the ticket. The simple conspicuous announcement—"No "change at the ticket office," or "No change for notes"—would save a great deal of time, trouble, and delay, because each passenger would have his money ready. There is also a fertile source of accidents that ought to be forbidden under penalties—working railway servants overtime. The most willing are the most overworked. A railway servant writes:

> A goods guard on the South-Eastern Railway worked on September 22, 18¼ hours; September 23, 19½ hours; September 24, 17½ hours; September 25, 18½ hours; September 26, 18½ hours; September 27, 14¾ hours; making a total of 106¾ hours in six days. Another one worked on September 29, 19 hours; September 30, 20½ hours; October 1, 21 hours; October 2, 18½ hours; October 3, 22¾ hours; October 4, 15¼ hours; making a total of 116¾ hours in six days. The men themselves can have no interest in working in this way, for, although their duties are most responsible and arduous, they only receive their bare week's pay for a week's work, payment for overtime being unknown. The same system is in vogue on other lines on this side of the Thames, and not only are goods guards working these long hours, but engine-drivers and others also. Of what use are the best of precautions under these circumstances?

There are financial advantages the Home Rulers and other Irishmen enjoy which Englishmen ought to agitate for. Turnpike tolls have been abolished in Ireland. The police in Ireland is a charge on the National Exchequer, a compensation for losing the protective duties on grain, although, as a matter of fact, oats, the chief export of Ireland, have been, on the average, dearer since the repeal of the corn laws than ever before. Since the passing of the Local Government Act, which applies to both kingdoms, the cost of such business as transferring the management of the roads from the grand jury to the town authorities of Wexford was only £40; it would previously have required an Act of Parliament, at a cost of from £500 to £1000. Loans are largely required in Ireland to promote public works. It has been suggested that the present complicated system might be advantageously replaced by the provisions under which the Metropolitan Board of Works borrow their money. Pawnbrokers in Ireland have a grievance not due to Saxon rule. They still pay taxes imposed by their Irish Parliament, taxes from which the English pawnbroker is free.

A letter from the head master of Eton has revived the great boarding-house question. Each Eton master has about 30 boarders, who reside with him rather less than 40 weeks in each year. In consequence of the rise in the cost of provisions, they claim an increased payment of £11 each per annum—say 7s. 6d. per week. An opportunity we have lately had of examining the contract prices for five years of feeding the inmates of a great almshouse where everything is done on a very liberal scale—the best beef and mutton twice a day, good tea and coffee, good butter, good beer—shows an increase of about 2s. a week for each inmate; but then this is managed with a degree of economy not to be found or expected in the housekeeping of a private establishment. The whole dispute arises from the cost of board and the cost of internal supervision being mixed up together. It is not a good system, but it is the system, and if the masters were not too highly paid before—which they may have been—they will not be too highly paid with the increase they claim. We cannot help thinking that Eton College, with its thousand pupils, affords room for a contractor-cook with a suitable establishment to take all the difficulties of feeding off the masters hands, like the *traiteur* of France and Italy.

The Middlesex magistrates have been exercising their privileges in their usual comical manner. A dozen old gentlemen, the majority past the threescore and ten years assigned as the age of man by the Psalmist, some very deaf, some very blind, some both deaf and blind, sit for two or three days to settle or unsettle the amusements of public-houses and music-halls of the metropolis at their will and fancy, without the vestige of a principle to guide their decisions. Some hundred holders of music and dancing licences are compelled to kick their heels in the ante-room of that architectural abortion, Clerkenwell Sessions House, for hours, on the chance of some magistrate asking them a question. Perhaps it may be quite right to abolish all music-halls, and shut every room for balls where tickets cost less than a guinea each. Perhaps both music and dancing are vices, which ought to be discouraged, and if so, of course a bench of judges both decrepit and deaf are the right people not to sympathize with pedal activity and sweet sounds; but if that is so, surely the system of licensing theatres is altogether wrong. The Lord Chamberlain grants a licence, which is enjoyed as long as the holder behaves himself. If he misconducts himself, he is warned, like the Court Theatre and "Happy Land," or the Opera Comique and "Kissi "Kissi." The manager amends his errors, and sometimes makes his fortune. At any rate there is one responsible person, the Lord Chamberlain. But the body that grants and refuses the licences connected with music-halls and public-houses is fluctuating, not every year, but every hour. At one moment a place is licensed for the express accommodation of well-conducted harlots; at the next, a licence is refused for a place where concerts of the highest class and balls of unquestioned respectability are to be held. A good whip of outlying magistrates sometimes overwhelms the quorum of old gentlemen. Surely matters so important as the amusements of the metropolis should be administered on some sure and certain principle by a fixed tribunal, guided by legal evidence—the stipendiary magistrates of each district, for instance, well acquainted with the wants of the inhabitants, and the behaviour of each public institution, from daily reports. To refuse a licence, which involves a large capital, without ample notice, on a private report or the prejudice of a single magistrate, although the decision may be quite right, is contrary to every principle of English justice. The present active quorum of Middlesex magistrates is about as fit to decide on a question of amusement as a bench of total abstainers on public-house licences. They do not dance, they cannot see very well or hear very well, or if they can, detest all sounds and sights not connected with making money; but they can drink, and we all know that

> A fellow feeling makes one wondrous kind.

Mr. Reed, now contesting Hull, was a very bad Admiralty official,

but he would make a very useful member of Parliament. He was the wrong man at the Admiralty, because, with a jealousy common in public offices, he allowed no improvements that he did not originate or appropriate himself, and the cleverness of one man is not enough for a nation. But in the House of Commons he will be a valuable critic. His main object in going there is to worry Mr. Childers; but good may come out of bad motives. That he is little scrupulous is shown by the wholesale way in which he swallows any pledges that will secure votes; but he is a superior naval mechanic, and Mr. Childers is well able to take care of himself.

Circular to Gas Companies.

THE reports of the half-yearly meetings we publish to-day show the gratifying fact that, notwithstanding the adverse circumstances which press upon our industry, four of the metropolitan companies are in a position to pay the maximum dividends to the shareholders, and in each case have a small balance to carry over. This fortunate result is to be attributed to the largely increased receipts for residual products; and the candid chairman of the Phœnix Company was at pains to explain to his shareholders that, in their case, the profit was wholly derived from the sale of residuals, a statement the agitators are sure to seize upon whenever the company propose to raise the price of gas. While coal remains at anything like the present rates, coke will, of course, be in large demand, and will command a high price. How far, however, it is good policy to sell gas at less than cost price is questionable. It is hardly to be expected at the present time that the gas-rental will exceed the total expenditure on revenue account, or "cover all the costs of carrying on the concern," and in none of the accounts we publish to-day does it appear to have done so. But we believe it is scarcely safe to count on residuals only for profit. The circumstances of the Phœnix Company fully justify a small rise in the price of gas, which the directors will, no doubt, be compelled to make in the ensuing quarter, and which might as well have been made before. The receipts for coke can hardly make up for the increased cost of coal during the current half year, and contractors at the end of six months may be in no better position to fulfil their contracts than now.

As regards the coal question, we are glad to have the opinion of the chairman of the Sheffield United Gas Company that the advanced cost is only temporary. We should like to know the grounds of this belief, for, to our mind, everything points to a continuation of high prices. The Sheffield Company are able to pay maximum dividends for the past half year, but their prospects for the next half-year are rather gloomy, and they might as well incur the odium of raising the price of gas at once.

Mr. Leslie, who has, after all, been elected to the Metropolitan Board of Works, seems inclined to continue at the Board the agitation on the sulphur question he so long carried on in his vestry. The following resolution has been agreed to on his proposal:—

That it be referred to the Works and General Purposes Committee to obtain from the solicitor a report, stating under what statutory powers the gas referees have added 50 per cent. to the amount of sulphur prescribed in the Metropolis Gas Act, 1860, viz.:—20 grains in 100 cubic feet of gas—this being part of the agreement by which the gas companies obtained the statutory power of districting the metropolis, the Beckton Gas-Works of The Gaslight and Coke Company not being interfered with.

The task of the solicitor is a very simple one, and we feel certain that the practical sagacity of the majority of the Metropolitan Board will prevent them from being persuaded into litigation, as the vestry of St. George's, Hanover Square, were. All the metropolitan companies implicated are actively engaged in adapting their works for more complete purification, and the referees have only acted with fairness in allowing a higher maximum of sulphur until such alterations in the purifying apparatus as may be found necessary have been made. In the meantime, we cannot see that any good can arise from trying the question whether the Imperial and South Metropolitan Companies Acts, 1869, do or do not allow the referees to fix a higher maximum than the 20 grains fixed by the Metropolis Gas Act, 1860. By a report of the Finance Committee of the Corporation of the City of London, we see that in the past ten years the Corporation have spent no less than £23,461 on account of the supply of gas and water. It is unnecessary to say that most of this money has gone into the pockets of the lawyers, and its disbursement in this way has necessitated a correspondingly great, if not larger, expenditure on the part of the companies. We are far from saying that the citizens of London have derived no advantage from this large outlay; but we will affirm that none has been obtained commensurate with the expenditure, while all the improvements would have followed in the course of time from natural progress. In proof of this, we may point to the fact that the gas companies still under the Metropolis Gas Act, 1860, who are under no obligation to supply gas of more than 12-candle power, regularly furnish their consumers with gas of 14 and 15-candle power. We should hope, then, that the Metropolitan Board will not be persuaded to harass the gas companies with litigation to obtain that which is certain to follow in the natural course of events.

The proposal of the Corporation of Limerick to sell the gas undertaking on which they have expended £33,000, and which is unremunerative, if the United General Company will sell theirs, which is remunerative, to "a citizen joint-stock company," is thoroughly Hibernian. As ordinary tradesmen they would probably laugh at the notion, if a bankrupt were to say to a prosperous man next door, that he would sell his business to a neighbour if he (the prosperous man) would do the same. The Corporation have failed and the company have succeeded. It is very natural that the Corporation should wish to fully recoup themselves for the outlay; but it does not look possible. Even a citizen joint-stock company would hesitate, we should think, before they commenced business with a millstone round their necks. We shall be curious to see the reply of the United General Company to the proposal of the Corporation.

A difficulty between the Town Commissioners of Enniskillen and the lessees of the gas-works, as to an advanced charge for the public lamps, was abruptly terminated by cutting off the supply and leaving the town in darkness. The experience of a few nights brought the commissioners to reason, and the lamps were again lighted. At Sligo, also, the Corporation were disposed to resist an advance of price; but ultimately, we believe, it was acceded to.

The Corporation of Leeds have determined on applying to Parliament next session for power to increase the maximum price of gas from 3s. 9d. to 5s. per 1000 feet. In Manchester, the Corporation Gas Committee have proposed a further rise of 5d. per 1000; but this is opposed, some members of the Corporation being of opinion that another 2d. will be sufficient to meet an estimated deficiency. The deficiency, it must be observed, is not an actual loss, but a deficit in the 10 per cent. profit which the Corporation expect to make on the undertaking. The proposed addition of 5d. will raise the price of gas in Manchester to the same rate that is charged by the Liverpool United Company, who pay a 10 per cent. dividend to their shareholders.

The inquiry at Wrexham, before Mr. G. A. V. Harcourt, relative to the application of the Wrexham Gas Company for an increased maximum price, brought out nothing remarkable. The order was opposed by the Town Council, on the ground that the company had raised capital to an excessive amount, and had expended large sums on new works, and in laying mains to distant localities which could not be remunerative. Some ratepayers also opposed, alleging that when the Wrexham Gas Act, 1870, passed it was understood that the price fixed was to be permanent. Their innocent memorial must have amused the commissioner. Pending the publication of the decision of the Board of Trade, it would be improper to comment on the evidence, which we shall give in a future issue, and we can only say that the case on both sides was ably put before the commissioner.

As we expected, the Kensington Vestry have accepted the offer of the Chartered Gas Company, and consented to the substitution of common for cannel gas. A member of the vestry seems to think that the consumers will not have their gas bills lowered by the alteration. This will, of course, depend on the consumers themselves; but we believe a real economy will be experienced so far as the gas bills are concerned, while something will be saved by the less frequent want of whitewash for ceilings.

We publish to-day a paper, read at the British Association for the Advancement of Science, on a "Continuous Process for Purifying Coal "Gas from Ammonia and Sulphuretted Hydrogen, and for Extracting "Sulphur and Ammoniacal Salts." The process of Messrs. Harcourt and Fison is ingenious, and may possibly be advantageously employed in small works, but appears to us expensive if large quantities of oxide have to be dealt with. Considerable plant would be required, and skilled superintendence would be necessary. If oxide should rise in price much, the process would have greater value; but the present cost of this substance is such that we doubt whether it would pay to go to all the trouble proposed in order to use the oxide for an indefinite time.

By the publication to-day of Mr. Sugg's valuable paper "On "Standard Burners" we complete our report of the proceedings at the last meeting of the British Association of Gas Managers. The paper, unfortunately, was not read at the meeting, and we are deprived of the opinions of the members which might have been elicited in a discussion. There can be no doubt, however, a general agreement with Mr. Sugg would have been expressed. The suggestion that all gases should be tested for illuminating power by Argand burners, with no pressure at the point of ignition, and that the rate of consumption should be varied according to the richness of the gas, is worthy of the attention of the referees.

GAS PURIFICATION IN LONDON.

IN the remarks we have made on gas purification, *à propos* to Mr. Patterson's pamphlet and patent, we find that we have not done full justice to one who has exerted himself with much success to improve our means of purification, and especially with regard to the removal of the "sulphur" impurity. We refer to Mr. Mann, of the City of London Gas-Works, whose name we have mentioned in connexion with the displacement of sulphuretted hydrogen by carbonic acid. In a patent dated Aug. 23, 1853, Mr. Mann made use of carbonic acid to deodorize foul lime. As bearing more particularly on recent disputes, we may quote the following from the first part of the specification:—"The invention consists, firstly, in the purifying of "gas from carbonic acid by ammonia, in combination with water, "which is mixed with lime to prepare it for dry lime purification." Here is a clear announcement of the importance of removing carbonic acid in the earliest stage of purification.

But when we wrote last we overlooked a subsequent patent of Mr. Mann's, dated Dec. 2, 1871, in which the process for the removal of bisulphide of carbon from gas is clearly described. "My in-"vention," says the specification, "is based upon the chemical fact "that the sulphides of the alkalies and alkaline earths combine "with bisulphide of carbon, and in carrying out my invention I "prefer to use the sulphide of calcium, or mixture of sulphide and "bisulphide of calcium, *produced in purifying gas* from sulphuretted "hydrogen."

The specification goes on to describe an arrangement of purifiers charged with hydrate of lime, which are to be used in such a way as that one shall be made to contain sulphide of calcium. When this is produced the gas is shut off from that purifier, or rather it is made

the last of the series, and the gas is caused to pass first through another purifier charged with lime (where carbonic acid is removed) then through oxide purifiers to remove sulphuretted hydrogen, and is thus fitted, says Mr. Mann, for entrance to the sulphide of calcium purifier. "It is presumed that the gas having passed through "hydrate of lime and oxide of iron has been cleansed from all impuri- "ties except bisulphide of carbon; now free to be acted upon by the "sulphide or sulphides of calcium, with which it will combine."

Mr. Mann's specification then describes a plan from scrubbing with sulphide of ammonium to remove bisulphide of carbon, particularly mentioning that the gas must be freed from carbonic acid before it is brought into contact with the sulphide of ammonium. We have quoted enough to show that the object of the two inventors is the same, and is based on the same knowledge. Mr. Mann's specification, however, wants the logical precision of description which characterizes Mr. Patterson's. We are reminded to-day that legal proceedings, which we understood had been dropped, are still pending; and, therefore, any further discussion of the matter in our columns cannot be permitted.

Correspondence.

COLONIAL GAS COMPANIES.

SIR,—I, as one of your subscribers, would like to see a list of the colonial gas companies published, and to commence it I beg to forward herewith particulars necessary regarding my company.

July 31, 1873.

E. B. PARSONS, Secretary,
Auckland Gas Company, Limited.

No. of Shares.	Amount Per Share.	Amount Paid up.	Last Dividend per Cent.	Last Quotation.
600	£5	All	£10	£10

GAS PURIFICATION IN LONDON.

SIR,—With reference to the letter of Mr. Patterson on this subject in the JOURNAL OF GAS LIGHTING of the 7th inst., I think it right to state that there is much in the letter that requires to be answered, and to which a good answer could easily be given by me were I at liberty to do so.

I think, however, that you can scarcely be aware that Mr. Patterson, some time since, commenced proceedings in Chancery against this company for alleged infringement of his patent for gas purification, and that these proceedings are still pending. I am therefore advised that it would not only be very irregular, but might be considered a contempt of court, were I to insert letters in your JOURNAL, which, either directly or indirectly, bear upon the questions in dispute in the Chancery suit above referred to.

G. C. TREWBY.

The Gaslight and Coke Company, Beckton Works, Oct. 15, 1873.

SIR,—In my former letter, as well as in my pamphlet, I gave several facts which show clearly enough that whatever references to the action of carbonic acid, and also to the power of sulphide of calcium to absorb CS_2, might be contained in chemical books, no attention was given to them in gas-works. Let me add another. Mr. George Anderson certainly knows as much about gas purification as most men, but on June 12 last,* at the meeting of the Gas Managers Association, he gave the following advice:—"If the lime is removed from dry-lime purifiers the moment it gives a black test by acetate of lead paper, a great mistake is committed, because the lime will continue to do good in the purification of gas for a long time after it ceases to attract the whole of the sulphuretted hydrogen." This was the idea prevalent among the best authorities—it was thought that the longer the lime was kept in action after SH_2 passed forward the better—whereas the fact is that from the moment SH_2 is no longer absorbed by the lime, the sulphuretted portion of the lime is rapidly diminished, until the whole of the SH_2 is expelled by the CO_2 and the lime converted into carbonate. The idea expressed by Mr. Anderson was the one which was acted upon at Beckton in the autumn of 1871, the results being known unto all men.

As a question of fact, therefore, I cannot admit that the chemical facts which I combined and turned to practical account in my new processes of purification were generally known; but if they were, nothing else could so amply and strikingly demonstrate the novelty and value of the processes in question. Whatever was or was not known, the sulphur question indubitably remained unsolved. Nay, it exists still, and by the testimony alike of London gas engineers and the gas referees, in a most formidable degree. In your last number you call attention to the fact that the referees have had to raise the sulphur maximum to 30 grains; and, moreover, you add, that this is "a limit which, we fear, cannot be maintained at some of the works." As the ordinary amount of sulphur (in other forms than sulphuretted hydrogen) in coal gas is from 34 to 38 grains, this is really a confession of inability to eliminate the "sulphur" at all. And this is just what the London gas engineers themselves reported to us referees in the summer of 1872, when we proposed to fix a 30-grain maximum.

Now, not to speak of lime, which cannot be employed in urban gas-works—nor of my soda process, of which you always speak favourably—is there not Ammonia in every gas-work in London, which if employed by my process would of itself (without either lime or oxide of iron) not only take out the bisulphide of carbon, but the whole of the sulphuretted hydrogen and carbonic acid also? You say gas liquor has been tried in all manner of ways. Doubtless, but with what results? *None whatever.* Indeed, what better proof of this can there be than that even now the sulphur maximum has to be fixed at 30 grains, and that you doubt if the impurity can be kept even at this amount?

Let me add that you are a little unjust to my late colleagues and myself in your criticism of the solitary sentence in our "First Sulphur Report," in which we speak of the sulphur compounds other than sulphuretted hydrogen as chemically neutral. It is true that bisulphide of carbon is acidulous, but, as you acknowledge, the bisulphide does not constitute the whole of the impurity; moreover, we were not descanting upon the chemical properties of the bisulphide, but spoke of it practically in connexion with gas purification. We said: "It is an easy matter to rid gas of any impurity which is either an acid or an alkali," such as "ammonia and sulphuretted hydrogen; but the case is otherwise with an impurity like 'sulphur.'" This is perfectly true, and every one knows that it is so. And although the phrase "chemically neutral" is not quite right *per se*, it is quite right taken in connexion with the context.

R. H. PATTERSON.

* The date should be June 12, 1872, and the remark was made in the discussion on a paper read by Mr. Fish.

THE RECENT EXPLOSION AT WAKEFIELD.

SIR,—Reports having appeared in several Yorkshire newspapers of a serious accident which happened at Wakefield through an ill-advised attempt to set in action an apparatus said to have been supplied by the "Air Gas Company," and as inquiries have been made of me, as the representative of "The New Gas Company," concerning the particulars, under the mistaken idea that either the two companies are one and the same, or their processes identical, I beg you will do me the favour to grant me space in your next issue to dispel the illusion, which is discreditable to my company and injurious to its interests.

The Air Gas Company aims at rendering common air luminiferous by impregnating it with hydrocarbons—an old story, the fallacy of which has been exposed over and over again, and may be described as the merest quackery imaginable.

The New Gas Company has for its object the economical manufacture of water gas, by such methods as ensure its permanency, and imparting to it great lighting power by the use of hydrocarbons of such a character that, when combined with the gas, the light-giving matters will travel any required distance through mains and service-pipes without loss by deposit therein, just as coal gas does, and with which it mixes most readily in any proportions desired, the two gases being of nearly the same specific gravity.

The first-named company is, therefore, an *air* company.

The latter a *gas* company to all intents and purposes, ready to aid existing coal gas companies in effecting economy by combining the use of its process with coal gas manufacture, and thus directly effecting a benefit to the public by reducing the consumption of coals.

21, *Parliament Street, Westminster, Oct.* 18, 1873. R. P. SPICE.

DUBLIN AND ALLIANCE GAS COMPANY.

SIR,—I can hardly allow your remarks upon this company in your last number to pass unnoticed, although I had intended to remain silent until a time, probably not far distant, when an opportunity would be afforded for explanation and for clearing away many unjust imputations.

I will only say now that since the coal panic commenced, or for the last three half years, we have used in these works over 15,000 tons of shale, yielding from 5000 to 8000 cubic feet per ton. What the condensation may be I have not ascertained, but probably more than for oil, which all goes to swell the "unaccounted-for" gas.

The leakage is accounted for by the wretched condition of the mains and services the company have inherited by the several amalgamations, and other causes. It is being reduced, and can be still further reduced.

Your pages are not the proper place to enter into comparisons of the working of this company with other companies, and its present condition is neither mysterious nor "utterly inexplicable;" and at present I will only ask you to correct an error you have no doubt inadvertently fallen into in comparing the wages at these works with the average of all the London works, which you quote in your last as 3s. 4·13d. per ton of coal in Dublin, and as 3s. 2·45d. as the average of all the London works for 1872.

In your number for Aug. 26, you quote 4s. 2·05d. as the average of all the London companies for supervision and labour in manufacture of gas, while ours is 3s. 4·13d.

And I find the average total manufacturing charges in all the London works is 6s. 7·35d., while ours is 6s. 2·09d., and for last year (1872), the same as the London companies, they were 5s. 10·42d. per ton of coals.

JOHN SOMERVILLE.

Dublin and Alliance Consumers Gas Company, Oct. 17, 1873.

[Our correspondent's letter arrived too late for us to review his figures for this issue. As regards the first statement in the letter, we may remark that the company's own accounts mention only coal, and say nothing of shale. We do not blame Mr. Somerville for the leakage, which, we are glad to learn, is being reduced.—ED. J. G. L.]

SIR,—I beg space in your next issue to say a few words on the Dublin Gas Company and the strictures on it contained in your last.

I have been conversant with Dublin gas doings for the last 15 or 16 years, and I know a good deal of what has brought the present company into the unfortunate position of being without a dividend.

First, there is a large amount of unaccounted-for gas, caused by having absorbed several previous companies which had duplicate pipes, many of them, from mere age, being in a very bad condition, as the daily removals of them by the present engineer fully testify; many of them, I fear, having been originally badly jointed, as I can testify from my observation of mains lifted with scarcely any lead in the joints, and some joints not "set up," and which it will take some considerable time to rectify in so large a city as Dublin—large in area, although not correspondingly large in population—also caused by the laying of the water supply-pipes by the corporation; indeed, the water waste of Dublin is double that of the gas waste. The former, in a recent number of your JOURNAL, was quoted from official sources at a quantity that equals 55 per cent.; and this is the self-same corporation who, with a water leakage of 55 per cent., found so much fault with the management of the company, and got English engineers to talk learnedly "of due care and management," and a 10 per cent. leakage being sufficient.

Another cause is the large mileage of pipes with a sparse population, and few manufactories; added, of late years, the early-closing movement, which in Dublin has been very general for the last five years.

With all these causes in action, I say that it is impossible to get a leakage account below 15 per cent., and I very much doubt if it will ever be got under 18, if so low. More than that, I do not believe that any case can be produced that will bear any analogy to Dublin, with a leakage account under 15 per cent., and I am anxious to be convinced to the contrary, if any one of "large experience" will be so good as to try.

In addition to the foregoing causes, there is the high quality of gas that the company, by the advice of previous engineers, has undertaken to supply, and tested by a burner which, as I am informed, does not develop its light by one or two candles, causing the use of so large a proportion of cannel, or more strictly, I should say, permitting the use of so small a proportion of common coal, that very little coke is left for sale, and that of inferior quality, commanding only a low price.

You have only to look at the cost of the coal per last balance-sheet, £66,982, and the amount received for coke, £13,236, to get a tolerable insight into the reason why there was no dividend last six months, although, of course, this will not account for the whole deficiency.

I know it may be said that the fuel account is high, therefore, there were small sales of coke. I at once deny that it is, as compared with London works, if I except a portion of the retorts set to be worked by Best and Holden's steam stoker, which were set by a previous engineer, and that engineer, as well as the secretary of the company, know that I stated they could not be economically heated. But these retorts were very little used the last six months; on the contrary, a large proportion of the retorts were newly set. They are 16 feet long, and heated well by a fire at *only one end*, and considerable credit is due to the present engineer for accomplishing that fact—a fact that was tried in London 20 years ago and failed.

I think that you will believe me when I state that I am not generally credited with the bestowal of praise where it is not due. I like to speak my mind, perhaps, as the world wags, too little regardless of the consequences; and, following that rule, I do not hesitate to state that if the gas-works of this country had their retorts as well designed as these last I have referred to, there would be more coke sold than there now is, and less of it used as fuel.

From the foregoing it would appear that we cannot account for the present position of the company through "gross mismanagement," if we confine the meaning of that term to the practical operations of the company; but if its meaning be extended to the obligations which the company have undertaken, then, of course, the management is bad where there is no dividend.

I presume, from your comparison with Liverpool, and the remark about the small yield of gas per ton, you are under the impression that cannel coal was used; but when I mention that a large quantity of shale was also used, which makes only 6000 to 7000 feet per ton, the force of the objection is lessened.

At the last half-yearly meeting of the company the whole of the directors resigned, and a new board was formed, including three of the former directory. I fear that it will be found necessary to apply to the Board of Trade for an order to raise the price of gas, and the company can ill afford to have the influence of the GAS JOURNAL quoted against them.

The causes of the present unfortunate position of the company are well known to its officers, but they are not of that kind which can be cured by a change in the governing body, but by a change in its obligations; and this can only be effected by the sanction of Parliament.

GEORGE ANDERSON.

Northumberland Street, Strand, Oct. 17, 1873.

A QUERY.

SIR,—Please will you kindly answer the following query, which is to me a great source of annoyance?

I am using Mickley Newcastle gas coal alone in the manufacture, working five-hour charges, with a nice heat, and yet the gas flame while burning *flickers*, with a tremendous lot of *red sparks* flying through it. What causes the flickering and sparks, and how can I get rid of them? G. A. R.

DEATH OF ANTHONY OWST-ATKINSON, ESQ., LL.D.—Our readers will learn with much regret the death of this gentleman, which took place at his residence, Clare House, Hull, on Wednesday, Oct. 8. Mr. Owst-Atkinson took a warm interest in the establishment of the British Association of Gas Managers, was a member of the Provisional Committee appointed in 1863 to assist in its organization, and was chairman of the first general meeting of members held at Manchester on May 11, 1864. He was 51 years of age at the time of his death.

Miscellaneous News.

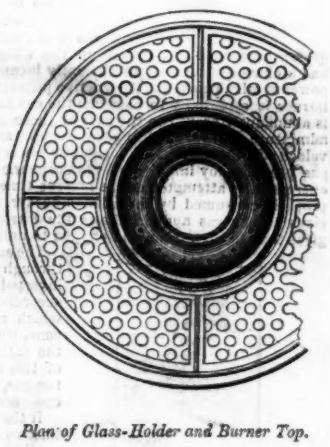
STANDARD GAS-BURNERS.

By WILLIAM SUGG, A.I.C.E.

The following paper was prepared for the recent meeting of the British Association of Gas Managers. It is now published with the assent of the writer, and will appear also in the Transactions of the Association:—

My first studies with respect to "standard burners" commenced in 1858, when, observing the difference, not at all slight, in the evidence given by some of the most eminent scientific men of the day relative to the illuminating power of what was supposed to be the self-same gas, I had the temerity to doubt, not the witnesses, but the photometrical apparatus with which they performed their experiments. A careful examination of the question, and a lot of so-called standard burners, which I obtained from different gas-works, very soon enabled me to see that all the difference in this scientific evidence might be easily accounted for without going any further than the burners. When I tell you that there was a difference of nearly six candles in as many of these infallible burners, I think you will agree with me that it is a wonder the scientific evidence was so nearly alike, and that instead of 25 per cent. difference in their estimation of 12-candle gas, there might as easily have been 50 per cent. Having so wide a field, I could not very well fail to do something better, and so I produced in 1858 the 12-candle Sugg's standard burner. Here is a drawing of it in section and plan.

Section of Sugg's 12-*Candle Burner (full size).*



Plan of Glass-Holder and Burner Top.

You will perceive it is simply an ordinary Argand long-chamber burner, with the iron top taken out and a steatite top put in. I was led to adopt the steatite, finding it was a very hard material, which could not be altered (it is harder than the hardest steel), and, as far as I could find, not affected by the action of heat or damp.

The old iron tops I found could never be kept long to any definite gauge, in consequence of oxidation.

The drawing is to a scale, and you will perceive that the area of the centre opening is more contracted than was usual with burners made at that epoch.

This burner was first used by the late Mr. Henry Banister, at the Chartered Westminster station, and was shown by the late Mr. George Lowe to a committee of the House of Commons, to whom he recommended that it should be adopted as a standard burner.

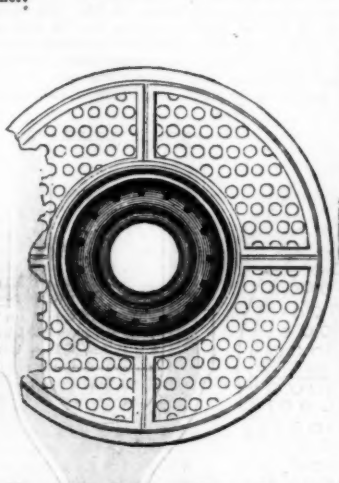
This was the first time that this proposition that the testing-burners should be made upon the same model was introduced to the notice of Parliament. Attention having been drawn to the important *resuscitated* fact that 5 cubic feet of gas could be made to evolve a very different power of light, according to the conformation of the burners through which it was consumed, almost all of the parties interested agreed at once that it was highly desirable that a model burner should be adopted. At this distance of time it doubtless appears to you that so self-evident a proposition ought not to require an hour's discussion, and that nothing could be easier than to determine upon a burner, and decide that in future all standard burners should be made upon that model, uniformity being, of course, the only thing required.

Perhaps before I have done I shall show you that this very easy-going, plausible-looking axiom—well enough as applied to some things—will not do in the sense in which it is generally used as regards standard burners. Certainly, nothing can be truer than that uniformity in the form of standard burners is very desirable, but that is very far from being the only thing required; comparatively it is but an inferior part of the question.

The first, and, perhaps, most important, point raised by the adverse parties at the time of the introduction of this burner by Mr. George Lowe was this—Shall that burner be adopted which gives the highest photometrical result, or *vice versâ*? Examined by the light we now possess on the subject, the question is a manifest absurdity. We say gas can only be of that illuminating power represented by the quantity of carbon and hydrogen it contains per cubic foot. Thus simply the standard quantity of 5 cubic feet contains, roughly speaking, so many grains of carbon in various forms diffused through a certain quantity of hydrogen and a little sulphur. These, brought into contact with the proper equivalent of oxygen necessary for their combustion, will evolve a certain amount of light which can under no circumstance be increased, although it may be diminished, either wilfully or accidentally.

If, therefore, by improperly consuming it, we only obtain 10 candles out of a gas which is capable, if properly consumed, of evolving as much light as can be got out of 14 sperm candles of six to the pound, when burning at the rate of 120 grains per hour, can it be said by any reasonable being that the gas in question is not 14-candle gas?

However you may answer this question, the opponents of the gas companies, with the late Mr. Samuel Hughes at their head, resolved that they would accept no model burner of any kind, considering it would be to their interest to leave the question open, and themselves free to make use of any burner they chose; so Mr. Lowe and his burners, not being sufficiently supported, were thrust out of the committee-room. Permit me to say, in parenthesis, that you will see, as I go on, that two principles which have exerted a considerable effect upon all mundane creations have very much affected standard burners. These principles are destruction and development. Unfortunately for gas, the former principle has had, up to the present, most decidedly the best of the battle; and, like an evil genius, has constantly interfered to introduce discord and confusion whenever there has been a chance. The principle of destruction has been and is now extensively at work in burners for consumers use. The rule is, if the gas is *smoky*, to bring down or destroy the illuminating power by a large admixture of air till it is on a level with *clean* gas. This is, of course, more easily done than to develop the illuminating power existing in the *smoky* gas, and then, besides, there is a *great economy* in burners. In consequence of the rejection of Mr. Lowe's proposal, for some time after this, adverse testers described the same quality of gas in very different terms. The testers for the companies stated the value of the gas as 14 or 15 candles, and the official tester for the different public bodies (consumers) stated its value variously from 11 to 12, and even lower. Mr. Hughes himself, on one occasion, triumphantly proved to his own satisfaction and that of the party for whom he was engaged that the gas supplied by one of the London companies and several of the provincial ones—notably Hanley, Potteries—was no more than 8 candles. Nevertheless, in the latter part of 1861, or beginning of 1862, Dr. Letheby, who was, I believe, the first official tester to see the matter in the proper light, substituted a modification of the Sugg's 12-candle burner for the old iron-top burner he was using at Jewry Street testing-station. After some discussions, the Corporation of London accepted it, and for many years, until the appointment of the gas referees under the Metropolis Gas Act, it was the acknowledged standard burner.

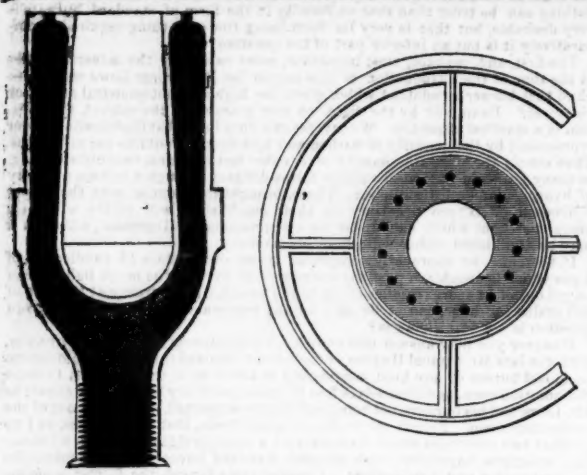


Plan of Glass-Holder and Burner Top.

Section of Sugg's 14-*Candle Burner (Dr. Letheby's Model)), full size.*

This burner for 14-candle gas was the first parliamentary standard burner. It is very much like the 12-candle burner shown in the diagram, differing in the size of the centre opening, which is ·48 instead of ·44 of an inch, and in having a perforated disc placed at the bottom of the gallery for the purpose of equalizing the admission of air.

About that time the Birmingham and Staffordshire Gas Company came before Parliament, and their bill was seized upon as a kind of battle-ground upon which to fight out the rival theories of destruction and development. The company desired to have leave to supply 14-candle gas at a certain price agreed upon between the company and their opponents. Everything also, as I believe having been settled, the *only* question in dispute between them was the kind o' burner by which to measure the illuminating power of this 14-candle gas. Mr Hughes and his party, in opposition to the company, instructed, as they now were, that the pecuniary value of the gas could be very much influenced by the kind of burner they employed, desired perhaps, having made their contract, to obtain a better article than that they had bargained for, and instead of adopting the straightforward course of fighting the question of price upon its commercial merits, and settling the scientific question upon purely scientific grounds, they mixed up the two, and the Birmingham so-called standard burner is the result. In saying what I have said, I do not mean to impute anything like dishonesty of purpose to the late Mr. Hughes, or any for whom he was concerned. They acted at that time as they thought rightly, but I mention it as an example of the folly of allowing party questions to be imported into scientific research. All they wanted was 14-candle gas at a certain price, and the company wanted to supply 14-candle gas at a price based upon calculations made and believed in by them. If they or their opponents were uncertain as to what was 14-candle gas, it would have been much better and more dignified to have settled the question of the burner first. I trust you will not think I am saying all this needlessly. If it were not that at the present day the very same line of conduct is continually persisted in, I should have left the Birmingham burner without a remark. I am of opinion that the very first thing to settle is the testing-burner, and afterwards the price of the gas.

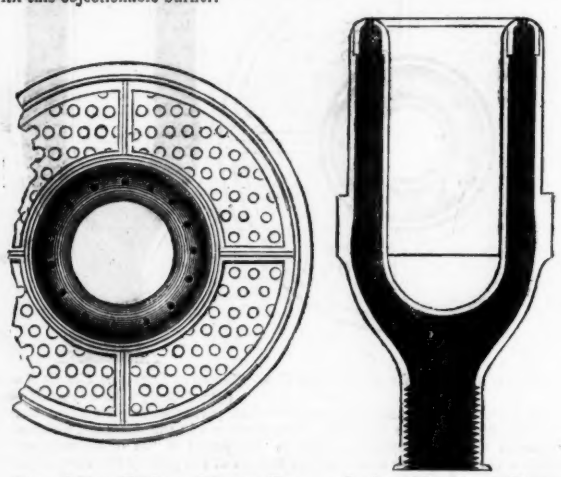


Section of Birmingham Burner (full size). *Plan of Glass-Holder and Burner Top.*

Now, if you will examine the burner, you will readily trace the conflicting principles in it. Thus the top is to be of metal, and flat, because the type of burner selected by Mr. Hughes was an old Argand iron-top burner, of the size called No. 6, originally intended for 30 holes, but drilled with only 15 holes, and flat on the top. The enlargement of the holes to ·050 was done by myself to modify its destructive property. It will be observed that the centre opening is truncated; here we again have the destructive principle, for the original No. 6 has an opening of $\frac{5}{64}$ of an inch, being straight all the way up. The principle of development is due to Dr. Letheby, and consists of a narrowing of the centre opening at the top.

The destructive principle is again apparent in the suppression of the perforated regulator, which was supposed by Mr. Hughes and party to exercise a marvellously improving effect upon the burner; whilst, lastly, the substitution of the metal top, composed of hard bronze, was a sublime effort of genius on the part of your humble servant, the burner maker.

The result is confusion. The burner is totally unfit for the use of the consumer, whose fingers it will assuredly burn most effectually if he attempts to touch it after it has been alight for some time. It is equally unfit for testing purposes being only capable of *consuming*, without smoking, exactly 5 feet per hour, of exactly 14-candle gas when new. It possesses the extraordinary faculty of decarbonating the gas burned through it, and depositing a part of the carbon in little heaps just between the holes. A fatal objection to it, as a standard burner, is that the size of the holes alter by the action of heat and the deposited carbon. It does not develop the full illuminating power of the gas, yet, notwithstanding all this, it was adopted as the testing burner for Burslem, Hanley, Potteries, and Brighton. The latter town has, however, succeeded in getting rid of it, but the other places are, I believe, still afflicted with this objectionable burner.



Plan of Glass-Holder and Burner Top. *Section of Leamington Burner (full size).*

The Leamington burner, of which you will observe there is a diagram, is a long-chambered Argand, with a steatite top and 15 holes, and, like the Letheby burner, it has the perforated disc for the regulation of air. I may here state that the air-regulator was never supposed by me to have any effect towards increasing the illuminating power. It merely prevents the four arms, which support the gallery, from marking their presence on the flame, which they otherwise would, by four depressions, one over each arm.

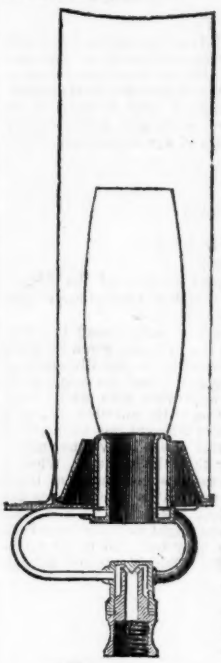
Dr. Whitmore conclusively established this fact when he made a quantity of experiments for the Marylebone Vestry, with a view of settling upon a standard burner for testing the gas supplied to them by the Imperial Gas Company. The burner settled upon, which I call the Imperial burner, is the same as the Letheby burner, with a slightly larger central aperture. This, however, never became a parliamentary standard burner, because the bill promoted by the Imperial Company, in which it figured, shared the fate of a great many other "innocents."

One remark must be made, however, with regard to the Leamington burner. It will be observed that it has only 15 holes, although the ring of the holes is much larger than the 14-candle burner. I need not point out to you that this is one more of the muddles which one gets into by endeavouring to apply a fixed rule to varying circumstances. If 15 holes be right for the 14-candle burner, it is manifest that the holes being wider apart in the 18-candle burner must exercise a destructive effect upon the gas—18 holes would have been much better. In this case, however, as in the case of the Birmingham burner, probably the like cause produced like effects.

We now come to the Dublin burner for 16-candle gas. This, you will perceive, is similar in form to the Letheby 14-candle burner, the central aperture only having been increased for the admission of more air to the richer gas. Some mistake appears to have been made in describing this burner in the Dublin Gas Company's Act, for the dimension there given for the central aperture is ·60, the same as the Leamington for 18-candle gas; and, in consequence, the company was compelled to come to Parliament to get it altered. I shall perhaps have to speak further of this in another place.

I now pass on to another epoch in the history of standard burners, in which the principle of development has exercised a very powerful effect upon the settlement of the question of the illuminating value of gas. In 1868 the gas referees appointed under the Metropolis Gas Act, as you are all doubtless aware, advertised for a burner conforming with certain principles laid down by that parliamentary committee on the Metropolis Gas Bill known as "Mr. Cardwell's committee." As the effect of the action of that committee has been, and doubtless will long continue to be, felt by all gas companies, not only in London but throughout the kingdom, it will be as well if I give you those principles.

They embody the definition of what a standard burner ought to be, and take into consideration not only the interest of the consumer but also of the gas company or seller of gas. For the first time then we see the question divested of party feeling, and placed upon purely scientific grounds. The requirements were, that it should be the best for developing the illuminating power of the gas supplied by the seller, and at the same time the best for the use of the consumer.

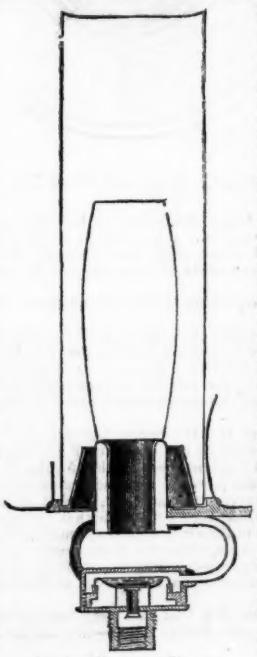


London Burner.

The London burner was accepted. This is a diagram of it now before you. You will see that it differs from all the preceding ones in several important points. First, the holes through which the gas escapes at the point of ignition are, in number and size, so arranged that every jet blends, and the area of the sum of the holes on the top exceeds so far the area of the three holes by which the gas enters into the combustion chamber, that the gas which has been admitted is allowed to escape without pressure. By this means it is consumed as a natural flame similar to that of an oil lamp. The oxygen of the atmosphere combines by affinity with the hydrogen and carbon of the gas, while the nitrogen is permitted to escape freely. The quantity of air required to pass up through the chimney of the London burner for the development of 5 cubic feet of 14-candle gas may be roundly stated as 50 cubic feet, or nearly ten times the volume of the gas; of this probably the greater portion goes up through the centre aperture. Its velocity, as it passes out of the top of the chimney, will therefore be about 1100 yards per hour, or a little under two-thirds of a mile. The quantity of oxygen in the 50 feet of air is 10½ cubic feet, and the remaining 39½ are nitrogen with about 1 per cent. of sulphur and carbonic acid mixed with it. Two cubic feet of pure oxygen would properly consume the 5 feet of gas if applied to it through the chimney, and less than that if intimately mixed with the gas—a highly dangerous proceeding which I have not verified out of respect to my own safety.

You will see that more than half the oxygen passes through the burner unaffected.

If we attempt to make this escaping oxygen come into contact with the flame by means of deflectors, we destroy the illuminating power, because we not only deflect the oxygen, but the nitrogen also. The destructive effect of the nitrogen is so great, that the heated particles of carbon are extinguished and blown up the chimney unconsumed, without having had a chance of becoming sufficiently incandescent to develop any illuminating power at all. This is the destructive principle. The object, then, of the London burner is essentially to consume the gas as a natural flame. How it succeeds is abundantly proved in the case of those gases which, from their richness or admixture with very light hydrocarbon or atmospheric air, will not bear a great velocity in the current of the gas or air supplied to them. For example, the gas produced by impregnating atmospheric air with very light hydrocarbon, so energetically attempted at the present time by so many inventors, can only be properly consumed by the London burner, which, by the low initial velocity it gives to the gas and air, allows the nitrogen in the air to escape easily, and gives time to the carbon and oxygen to unite together.



London Governor Burner.

The entry of the gas to the burner is effected through the screw regulator, as shown. The inverted cone opens or closes the passage according to the number of card washers which are placed on the shoulder of the cone, which is screwed on the chandelier, or the fitting to which it is fixed. The effect of this regulator is to lower the velocity of the gas, so that it may enter the combustion chamber at the lowest practicable velocity.

If the gas were allowed to enter this combustion chamber with any high velocity, it would be impossible afterwards to reduce it, and destruction instead of development would be the consequence. When the London burners are employed by the consumer, it is usual to maintain the uniformity of pressure at the meter by means of an ordinary governor, and to regulate the quantity required to be consumed at the point of ignition by means of the screw adjustment here shown. This I call double regulation. The new London self-acting governor Argand is provided with a small dry governor in the place of this regulator. One of these burners is also shown. It will maintain a constant height of flame under variations of pressure from 7-10ths to 2 inches; after that it decreases the consumption a trifle. It also is provided with a screw adjustment on the top of the governor, by which the consumer may readily adjust the quantity he desires to burn.

The identical kind of burner used to test the illuminating power of the gas is made use of to great advantage by the consumer, and he is enabled to get the full value in light for the quantity of gas he consumes.

Thus, the standard burner is a guide to him how to consume his gas to the best advantage, and when he is told that the result

of the official test is 14, 16, 18, 20, or 27 candles, he knows that he can by its means obtain just that amount of light for every 5 feet of gas he burns.

Previously to the introduction of the London burner, it is well known that the light obtained by the consumer from 5 feet of gas bore no proportion at all in the generality of cases to that stated by the official gas-testers.

Notably so in the case of 12 or 14 candle gas, for the consumer generally obtained only one-half the amount of light, owing to the destructive properties of the burner he employed.

Commercially, the value to the consumer of the London standard burners may be thus shortly stated:—

Compared with the oil lamp standing on this table, which evolves the most light that can be obtained from colza oil, being about 15 to 20 per cent. more than can be obtained from the same quantity of oil consumed in any well-constructed moderator lamp. The result is as shown in the following table:—

COMPARATIVE COST OF LIGHT

produced from gas burned through the "London" standard burner:	produced from ordinary colza oil burned through a moderator lamp of best construction:
24 feet of 23-candle gas will give a light equal to 10·5 parliamentary sperm candles of six to the pound, and cost, at 7½d. per 100 cubic feet in London, less than 2d.	One pint of oil consumed in 12 hours gives an illuminating power of 10·5 parliamentary sperm candles of six to the pound, and costs 6d., or three times the cost of gas.

Cannel Burner.

For cannel gas, the only burner which may be called a standard is that used for testing the cannel gas supplied to some parts of London. This is called by the gas referees in their instructions to the gas examiners "Sugg's steatite bat'swing, No. 7."

This is a drawing of it in section. The quantity it is required to consume for the purposes of testing the illuminating power is 5 cubic feet per hour.

The pressure at the point of ignition when it is passing that quantity of gas is 3½-10ths.

It is made use of for testing gas of from 22 to 25 candles illuminating power.

Dublin Burner.

The "Dublin" burner for cannel gas, of which there is a drawing, is one which has been agreed upon between the Corporation of Dublin and the Alliance Gas Company for the purpose of testing the gas supplied to the city. You perceive it is a double-current flat-flame burner. It is made to consume 5 cubic feet of gas per hour, at a pressure at the point of ignition of 5-10ths.

The gas which it is intended to test is stated in their bill to be 20 candles.

Now there are several very important points connected with this burner and the preceding one, to which I wish to draw your attention.

First, you will notice that the pressure at the point of ignition is in both burners very high, as compared with that used for testing 16-candle gas—viz., the "London." According, therefore, to my theory—which, of course, I believe to be the only right one upon the subject—they neither of them comply with the requirements of Parliament as laid down by the "Cardwell committee." They do not develop the full illuminating power of the gas which is tested by them, and therefore they ought not to be accepted as standard burners by the official gas examiner, neither are they at the same time the best burner for the consumer. Excepting for a butcher's shop, or where a great flare is required, regardless of unconsumed gas, they cannot be said to be made use of by the latter.

Five cubic feet of rich gas per hour is, I think, too much to be conveniently and properly consumed in one burner.

The least agitation of the air causes these burners to give off partly consumed gas, and in consequence a great quantity of lamp-black of a not very superior quality is gently distributed over all the ceilings and furniture in rooms where they are made use of. This last remark applies not only to them, but to almost every kind of cannel burner in use. Hence the idea that cannel gas requires strong pressure at the point of ignition. Of course it does if you will persist in burning the gas in a burner of such a form that the oxygen of the atmosphere cannot combine with it by a natural affinity. If there were no pressure at the point of ignition of a flat-flame burner the flame would be in a mass, and the oxygen could not get to it; pressure is required to blow it out into a flat flame, and so the particles of carbon are driven out like a regiment of soldiers extending out into skirmishing order, separating farther from each other the farther they go, until they either meet with oxygen to combine with them or nitrogen to extinguish them. Carry out this experiment to its ultimate result, and you will find that the illuminating power of the same quantity of the same gas burned through a series of different flat-flame burners will go on losing its illuminating power as the pressure at the point of ignition increases, until it ends in complete destruction. Now, look at your enemy, the moderator lamp. I suppose no one will deny that the gas being evolved from its wick, and consumed as rapidly as it is made, is not of a richer quality than even the Edinburgh cannel gas is, and yet it is consumed without pressure at the point of ignition.

Petroleum gas is richer still, and yet in Hinks and Wells's duplex lamps you have a light equal to 16 sperm candles evolved without pressure at the point of ignition, but at a little more than *double* the cost of 16-candle gas in London. I may as well state in passing that here in Edinburgh the cost of this beautifully rich gas is such that the enemy is left far in the rear, and so the Edinburgh folks can afford to waste some of their illuminating power. But even here the enemy has one advantage over you. If you disregard waste you must use more gas to produce the same amount of light, and the more gas you burn the more heat you evolve. So the lamp which gives the greatest amount of light with the least consumption of gas is preferred very often for this very cause, although it costs more. Yet, again, since the days of Argand, a host of inventors have put into action for the benefit of the lamp an enormous amount of ability and talent, and no expense has been spared to push forward the lamp to its extreme limit of perfection. And good reason for it, for the aristocratic lamp has had to strive against a powerful plebeian adversary. Art and science have both done their best for the genteel lamp. Gas, on the other hand, has been left to blaze itself into general use the best way it can by its great merit, cheapness, and constant readiness. I have now the honour of addressing a body of men who possess among them an amount of theoretical and practical science in relation to gas unequalled in the whole world, who have literally, not poetically, toiled day and night to bring the science of artificial illumination to its present state of excellence, and who have always been and still are the leaders throughout all the world of those whose vocation it is to continue the blessing of light to a large portion of the civilized human race, when the sun has, in poetical language, sunk to his rest. Yet the toil of your brain and the labour of your hands at the retort and purifier are, to a large extent, nullified at the culminating point by a miserable little bit of iron worth less than a farthing. There is yet another point on which the question of the proper standard burner for cannel gas touches you nearly. We speak of 20, 25, and 30-candle gas, &c.—to some people *ad nauseam*.

But can any of you tell me what 20-candle gas is? In London we are told that 5 cubic feet per hour of 23-candle gas will give a light equal to 23 sperm candles, &c., when burned in a burner which requires 3½-10ths at the point of ignition to get this quantity out of it; and this is 23-candle gas according to the gas referees. If so, then what quality is the gas supplied to the city of Dublin, 5 cubic feet of which will give a light equal to 20 candles when burned through their *so-called* standard burner under a pressure of 5-10ths at the point of ignition? If what I have told you is true, that pressure at the point of ignition decreases illuminating power, can it be possible that the gas is anything like 20-candle gas? Without a doubt, if the cannel gas supplied to London is a true 23-candle gas—I say it is certainly that, if not more—the Dublin gas must be very much more than 23 candles. Now you will see at once that there may be a very wide difference in the estimated cost of gas called 20 or 30 candle gas, unless you know very well beforehand what your burner is going to do for you. I think this will account in a great measure for the conflicting statements before committees of the Houses of Parliament, which put our worthy legislators so frequently in a state of bewilderment with respect to gas matters. I give more prominence to these facts than I otherwise should, because, if the example of the Dublin Gas Bill is to be followed, we shall be farther than ever from any satisfactory definition of the relative illuminating power of gases produced from different sorts of coal or other materials.

Having now arrived at the conclusion of my description of standard burners, you will naturally ask me why, considering that I have made nearly all the burners that have been used for gas-testing since about 1860, I have not made them better. I at once reply that, with the exception of the London burner, I have always been fettered by restrictions as to the size of the burner or number of apertures, &c., which have been already fixed by previous old Acts of Parliament, or by agreement between the adverse parties, before I have been applied to.

Now as to what can be done for the future, for I hope that we are not always to go on in the present unsatisfactory manner. I think that the selection of standard testing-burners for different qualities of gas is as important as the settlement of the sizes of a standard cubic foot measure or the length of a 2-foot rule. It is, in fact, a Board of Trade question, and should be settled by the proper officers appointed by the board—viz., the gas referees or the Standards Department. With such eminent talent as is possessed by the present board of gas referees, they can scarcely fail in arriving at a satisfactory result, if they take up the question. I can only offer to point out what I imagine would be a very good way of dealing with the question, viz.:—

1. To test all gases for illuminating power with an Argand burner; no pressure at the point of ignition.
2. To fix the rate of consumption at the burner by the following scale:—12-candle gas, 6 feet; 14-candle gas, 5 feet; 16-candle gas, 4½ feet; 18-candle gas, 4 feet; 20-candle gas, 3½ feet; 25-candle gas, 3 feet; 30-candle gas, 2½ feet.

About three Argand standard burners will then be all that is required for all these gases; or, in another way, one only might be used, burning the flame up to a certain fixed height in the glass, and then give a table of illuminating power ranging from the lowest consumption required to give the proper height of flame to the highest, calculated after the rate of 5 cubic feet per hour.

The adoption of either of these systems, more particularly the first, would enable us to give the proportionate illuminating power of every kind of gas, which we cannot do under present circumstances. Now common gas is tried by an Argand burner, and cannel gas by a flat-flame burner; consequently, from 18 to 20 candles, we are in a state of doubt as to when to leave off with the Argand and when to take up the flat-flame. Moreover, when we test with an Argand our readings on the photometer show the amount of light which can be got from the burner in any direction, while when we test with the flat-flame burner we get only the greatest amount of light which can be given from the flat of the flame. Thus, strictly speaking, the Argand may be said to light a circle and the flat-flame an oval of greater length as compared to its width, as the flame is broader or narrower.

Great difficulty is therefore felt by gas engineers in estimating the relative value of cannel and common gases, and the consumer has at present no guide as to the best way of using the gas supplied to him.

If we look again to the enemy we shall find that custom has determined that the size we have before is that which most effectually supplies the requirements of those in need of artificial light from oil, and guides to the proper amount of light from each point of ignition. Too strong a light in one point is not good; it is required to be well diffused in order to minister properly to our comfort. Now the amount of light given by this lamp in good burning order is 10·5 candles. This, in my opinion, is rather weak for gas. Every one expects more light from a gas-burner than from oil. Now if we take the scale I have formerly laid down we shall get a burner of 13 to 14 candles each, no matter whether the gas is 12-candle or 30.

With the other form there would most likely be no greater difference than half a candle with any of these gases. Now these, I presume, are exactly the conditions the consumer requires to be fulfilled. He wants to pay no more for his light, whether he is supplied with rich or poor gas; he wants a certain amount of light at a certain price per candle of illuminating power, and these standard burners would, in my opinion, show him how to get it.

It does seem rather curious that, although in every other invention, hat has been submitted to the public, even if it is only a mousetrap, full directions have always been given by the seller how the buyer is to make use of it to the best advantage, yet in the matter of gas the latter has been left almost in every case to his own devices.

In conclusion, I regret that I am unable to do more than shadow forth a system of standard burners; but that is as far as I have got at present. I am continually working at it, and hope in time to clear away the difficulties in the path, and work out a system of photometry suitable to all kinds of gases, more accurate than what we at present possess.

If, as is most probable, any statement or remarks I have made may not accord with the opinions of those among you who have given some considerable attention to the subject, I shall be glad to enter into further explanations with a view of either converting you to my notions, or of being corrected myself.

ON A CONTINUOUS PROCESS FOR PURIFYING COAL GAS FROM SULPHURETTED HYDROGEN AND AMMONIA, AND FOR EXTRACTING SULPHUR AND AMMONIACAL SALTS.

By A. Vernon Harcourt, F.R.S., and F. W. Fison, F.C.S.

[A Paper read before the Chemical Section of the British Association.]

The introduction of "oxide," for purifying "foul gas," has furnished the gas-maker with a process which might fairly be described as continuous when compared with the use of lime. But after the oxide has been alternately sulphurized and revivified twenty or thirty times, it is rendered inert by the accumulation of sulphur, and fresh oxide has to be substituted for it. The spent material, consisting of a mixture of oxide and sulphur in about equal bulks, is either burnt like pyrites on the hearth of the vitriol-maker, or it is heated until the sulphur is separated by sublimation. In either case the oxide itself is rendered anhydrous by the action of heat, and cannot be used again for gas purification.

Ammonia is most commonly removed from gas by "scrubbing," and the construction of scrubbers, and the mode of working them, has been brought to great perfection. Nevertheless, this process is liable to some objections. The scrubbers are bulky erections, and the cleansing of them, which is generally found to be necessary from time to time, is a troublesome operation; also, the ammonia is not obtained in the most portable and saleable form, as a solid salt, but as a solution containing perhaps 20 ounces of ammonia in a gallon of

water. Although the volume of water used in scrubbing gas is relatively very small, it cannot fail to produce some reduction of illuminating power, since olefiant gas is far from insoluble, and a more copious washing reduces the illuminating power in a very noticeable degree.

The use of copperas, or of sulphuric acid and sawdust, or of other substances that may be employed in a similar manner, is commonly designed to supplement the use of scrubbers, and requires the appropriation of a distinct set of purifiers, or at any rate the material used to stop ammonia must be kept separate from that which is used to stop sulphuretted hydrogen.

The extraction of sulphur from the spent oxide, and the manufacture of ammoniacal salts from the liquor, are operations which the gas manufacturer generally makes over, as too troublesome for him to undertake, to the manufacturing chemist.

The process about to be described is one which we believe it will be both advantageous and easy for the gas manufacturer to conduct upon his works. It effects the removal of sulphuretted hydrogen and of ammonia simultaneously, and yields sulphur and sulphate of ammonia in a nearly pure state. It renders the erection of scrubbers, and pumping, and the washing of gas with water, unnecessary. It restores the oxide, from which sulphur and sulphate of ammonia have been extracted, to the purifiers in the form of pure hydrated oxide, so that the same oxide may be used for an indefinite time.

The new process is at once applicable wherever oxide is or can be used as the agent of purification, the only differences in the mode of working being that the oxide, during revivification, is moistened with a solution of ferric sulphate (persulphate of iron), and that a portion of the oxide is removed from time to time, and treated in the following manner.

It is first extracted with water, by the use of an arrangement similar to that employed in the extraction of black ash. The soluble salts are sulphate of ammonia, formed in the purifiers by the reaction of ammonia and ferric sulphate, and (in smaller quantities) sulphocyanide, hyposulphite, and, probably, other salts of ammonia. This extract is mixed with a small excess of sulphuric acid, and yields, when concentrated by evaporation, crystals of sulphate of ammonia.

The remainder of the substance is then boiled with dilute sulphuric acid, which dissolves the oxide, and leaves a residue of sulphur. The actual process of extraction by acid consists in treating the substance successively—1, with a solution of ferric sulphate, containing some free sulphuric acid; 2, with a more dilute solution of ferric sulphate to which sulphuric acid has been added; 3 and 4, with more dilute solutions of ferric sulphate—all these liquids being the produce of a former extraction; and 5, with water. The liquid resulting from the first of the treatments enumerated above is a strong solution of ferric sulphate, which is used, as already mentioned, by being mixed with the charge of oxide before it is replaced in the purifier. The residue, after the final washing, consists almost entirely of sulphur, and requires only to be dried.

It will be evident that all the oxide which has been freed from sulphate of ammonia and sulphur by this treatment passes into the condition of ferric sulphate, and, in this condition, is replaced in the purifier. There it again becomes oxide by the action upon it of the ammonia of the gas, which it completely removes, while the ammonia is fixed as sulphate.

In order to obtain by one operation all the ammonia formed in the retorts, and to ensure the passage into the purifiers of a quantity of ammonia sufficient to neutralize all the acid employed in dissolving the oxide, we propose, further, to run the liquor from the condensers into a chest heated by steam, through the top of which a current of gas passes, which is drawn from beyond the purifiers and re-enters the main leading to the condensers. By a suitable arrangement the condensed liquor may run continuously through this chest, passing off after it has been heated in the current of purified gas.

(We are informed that the process is about to be patented, and that it is now in operation at Burley-in-Wharfedale, where it was recently inspected by the committee and others of the Chemical Section of the British Association.)

GAS AS A FUEL.

Two of the three prime necessaries of civilized housekeeping—water and light—are now provided in our city homes without carriage. The third, fuel, is still subject to many troublesome and expensive handlings. Consider the cost of a poor man's fire, after the coal is paid for at the retail coal-yard. The retailer's profit and the cartman's pay for delivering the coal in small lots being included in the purchase price, we will leave them out of the account—though the cost of distributing a year's supply of coal throughout a city like this is something enormous—and take up our dirty fuel from the pavement at the consumer's door. If there is a hole in the side walk through which the coal can be pitched to its place in the cellar, its conveyance thither is a matter of small moment; but the chances are that there is no such convenience. In this more common case, the coal must be shovelled into pails, buckets, or baskets, and toilsomely carried to its receiving bin, perhaps through a preliminary alley way of considerable length. This cannot be done without an expenditure of time and strength, having a measurable money value, which increases by so much the original cost of the coal. The fire is wanted on the third, fourth, or fifth floor. Some one must descend to the cellar, shovel up the coal, and bear it by hand up the intervening flights of stairs, putting forth, it may be, more human effort than was required to lift the coal from its native bed in the mine. At the mine, coal lifts and carries coal; in our houses, the work is done by human muscles. In the process of feeding the fire the coal is handled again—a small matter when we think only of one bucketful; but multiply it by the number of bucketfuls handled every day in the city, and the product is an amount of labour not at all to be despised. While burning, the fire calls for constant attention; it must be watched, regulated, and renewed, each step costing still more time and labour, the grand aggregate of which, for all the coal consumed, is very great. Then the ashes must be taken up, sifted, and carried away, involving yet more cost of time and strength; and coals and ashes soil the hands, clothes, and furniture, which must be made clean again by additional labour. The burden of all this labour falls heaviest on the poor, for by them the coal is most frequently handled; but the rich are far from exempt. Could we sum up the cost of service employed in caring for our household grates and furnaces, the aggregate would swell immensely our yearly bills for fuel.

Further, the burning of coal in small quantities, as in cooking stoves and small heaters, is wasteful in the extreme. The combustion is imperfect, but a fraction of the possible heat is obtained, and much of that is wasted in cavernous chimneys. Then a large per centage of the coal is consumed when no heat is required, when it is objectionable even, to keep the fire in readiness for the time of need. In short, there are a thousand ways in which the original cost of coal is augmented and its efficiency diminished in the common crude and unscientific use of it for household purposes—ways never suspected by those who have never used a fuel which has none of the drawbacks of coal, which burns cleanly, quickly, perfectly, and requires no carriage—namely, gas. It is more than probable that our children will live to look back upon our wasteful, troublesome, and expensive fires as we do upon old time tallow dips and the fetching of water in buckets from the town pump. Already the use of gas as fuel, especially for cooking, has been proved to be not merely convenient but economical; and economical in spite of the fact that the gas used has been expensively and, for fuel, needlessly refined, and paid for at an exorbitant rate even for illuminating gas. A cruder product would answer just as well. "Don't never prophesy unless you know" is the sound advice of one of our humorists. In the face of the caution, however, one may safely predict that the fuel of the future will carry itself, and will leave no soot or ashes. Further, the combustion will be perfect, and under perfect control; and however small the quantity burned in any case, its full heating power will be developed.

For several months a friend of ours has been testing the availability of gas for these purposes. He has used a range having two separate burners for boiling or frying, and a third burner heating at once a roasting chamber (on the principle of a Dutch oven) and an ordinary closed oven for baking. Broiling is done in the roasting chamber under a sheet of flame which covers uniformly the top of the chamber. The range has ample capacity for a family of six or eight persons, though in the present case the cooking was rarely for more than two, living modestly yet fully up to the average of people in moderate circumstances, and having two meals always, generally three meals, a day. Biscuits were baked occasionally, but not bread, which, however, was almost always toasted in the roasting chamber under a full sheet of flame. During the three months just past the gas consumed, measured by a standard meter officially sealed, amounted to a trifle short of 1000 feet, costing, even at the high rate charged by our metropolitan gas companies, two dollars and a half, and averaging not more than one cent a meal. Had coal been used for the same cooking, it would have cost more to hire a boy to fetch it from the cellar and carry away the ashes.

The secret of the economical cooking can be told in few words. There was no fuel wasted. Its full heating power was scientifically developed where it was wanted, and just so much as was wanted and no more. There was no waiting half an hour for the fire to kindle and heat up the stove; there was no high degree of heat maintained when a lower degree would suffice; and the instant any portion of the heat was no longer required, that moment, generally speaking, the flow of gas was stopped. Was a certain temperature required at a given point for ten minutes, half an hour, or any other interval, the gauge could be set to maintain it uniformly and trustily. It was certain the fire would not get too hot, or go out, or vary in the least. This divested the cooking of half its trouble, and nine-tenths of its anxiety; and there was no food spoiled by accidental causes. It is true that such economical cooking involves more than ordinary care, intelligence, foresight, and conscientiousness on the part of the cook, still it is not more than the majority of women are capable of; and when cooking is thus made light, cleanly, and free from uncertainty and worry, there will be less repugnance on the part of well-to-do wives to this most important domestic duty.

If costly illuminating gas can be used economically for fuel, there can be no question of the feasibility of warming our rooms and cooking our food with gas less highly refined, and consequently much cheaper.—*Scientific American.*

METROPOLIS GAS SUPPLY.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the coal gas consumed in the parish of Marylebone:—

August, 1873.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon. in 100 Cu. Ft.	Sulphuretted Hydrogn.
	*Mean of 18 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas	16·27	17·20	15·64	26·34	10·30	16·99	0·85	None.
Chartered Company's common gas	16·70	17·07	17·31	29·12	13·20	11·74	0·60	None.
Chartered Company's cannel gas	21·47	22·10	20·80	26·41	12·67	20·04	0·93	None.

Mean of daily readings of barometer . . . 29·81
" " " thermometer . . . 71·12

September, 1873.	*Mean 18 Obs.							
Imperial Company's gas	16·74	17·51	15·80	24·08	9·87	14·89	0·66	None.
Chartered Company's common gas	16·63	17·40	15·81	28·03	13·66	11·56	0·53	None.
Chartered Company's cannel gas	21·00	21·81	20·00	23·98	12·35	21·80	0·86	None.

Mean of daily readings of barometer . . . . 29·82
" " " thermometer . . . 64·47

* Each observation consists of ten readings of the photometer, at intervals of one minute.

Throughout the months of August and September the illuminating power of all the three gases consumed in the parish was in all respects very satisfactory. The mean light of the Imperial gas was equal to 16·27 sperm candles in August, and 16·74 in September, and in both months it reached, on six or seven occasions, to upwards of 17 candles. The mean amount of sulphur impurity found in it in August was 16·99 grains per 100 cubic feet, and in September 14·89 grains, whilst the ammonia was considerably less than one grain. The mean light of the Chartered common gas was in August equal to 16·70 candles, and in September to 16·63 candles; this gas also rose on several occasions to upwards of 17 candles. The mean amount of sulphur in August was 11·74 grains, and in September 11·56. The amount of ammonia was a little over half a grain. The cannel gas gave in August a mean light equal to 21·47 candles, and in September to 21·00 candles, and reached to 22 candles. In this gas the largest amount of sulphur was found; it amounted in August to 20·04 grains, and in September to 21·80 grains. The ammonia was less than one grain. The pressure of all the gases was generally satisfactory, and on no occasion was the presence of sulphuretted hydrogen detected in any of them by the ordinary tests. The most satisfactory feature in connexion with the quality of the gas supplied to this parish during the last two months is the very marked reduction in the amount of sulphur impurity. For some time past the average quantity of sulphur found in 100 cubic feet of the Imperial gas has been 30 grains; in the last two months it has barely exceeded the half of that. Some two years ago, when I suggested that 20 grains ought to be the maximum allowed by law, I was considered as proposing something unreasonable and impracticable. I am happy to find, however, that it has at last been accomplished; and I tender my acknowledgments to the company for having to a considerable extent removed from one of our most important public and social requirements a very noxious and health-destroying impurity. The above results were obtained from the gas manufactured by the Imperial Company at their Fulham works, and from the Chartered Company's gas manufactured at their works at Beckton and Bow.

At a meeting of the Kensington Vestry on the 8th inst., Mr. A. Taylor in the chair, a letter from The Gaslight and Coke Company, proposing to substitute for the cannel gas now used, common coal gas of an illuminating power of 16 candles, was considered. The company stated that upon receiving a formal invitation from the vestry the directors would take steps to make the necessary alteration, which they trusted they would be able to effect by the 1st of July next. The clerk, Mr. Harding, stated that the present annual cost per lamp to the parish for cannel gas was £4. If, as expected, the company obtained, after January next, an increase of price, the cost would be £4 14s. On the other hand, 16-candle gas could be supplied at £3 14s. 6d.; and if 2½ feet per hour burners were used, as in some parishes, the cost would be £3 4s. 9d. Dr. Daniels was of opinion that the vestry should accept the offer of the gas company. He had consulted with some of the first gas engineers of the day, and he considered, from what he had heard, that it would be to the interests of the

ratepayers if they had the common gas. He alluded to a recent public meeting held in that room upon the subject, and pointed out that resolutions were passed in favour of a supply of the common gas. In his opinion 16-candle gas was all that could be desired. He added that he believed the gas company were really compelled to make the change proposed, and that they could not go on as at present. Mr. Freeman, although in favour of the proposed change, urged several reasons against it, amongst which were that all the roads would have to be taken up to lay new mains, that £10,000 would be thereby added to the present capital of the gas company, and the public would have to pay 10 per cent. upon it to the shareholders. The consumers would not have their gas bills lowered by burning 16-candle gas, but still he thought they should support the alteration, as it would give satisfaction to the ratepayers. Mr. Jago suggested, as an alteration of the mains was contemplated, the advisability of laying them in such a manner that meters would be attached to some of the lamps in order that the quantity of gas consumed might be ascertained. Mr. Bartholomew moved that the vestry do approve of the proposed change. Mr. Shapcott seconded the motion. Mr. Snell, as an amendment, moved the reference of the subject back to the committee. Mr. Gibbons seconded the amendment, which was put and lost, and the original motion was agreed to.

At the meeting of the Metropolitan Board of Works on Friday, Oct. 17, Colonel Hogg M.P., in the chair, the Works Committee reported (*inter alia*) the resignation of Mr. F. J. M. Page as gas examiner at the Millbank Street testing station, and recommended that Mr. Wills, gas examiner at the Ladbroke Grove station, be transferred to the station at Millbank Street, all the terms and conditions of his original appointment remaining the same. They also recommended that Mr. J. P. Fewtrell be appointed to fill the vacancy caused at the Ladbroke Grove station by the transfer of Mr. Wills, as above, at the same salary as that received by Mr. Wills—viz., £80 per annum—and upon the same conditions. On the motion of Mr. Leslie, seconded by Mr. E. Dresser Rogers, it was resolved—"That it be referred to the Works and General Purposes Committee to obtain from the solicitor a report, stating under what statutory powers the gas referees have added 50 per cent. to the amount of sulphur prescribed in the Metropolis Gas Act, 1860—viz., 20 grains in 100 cubic feet of gas—this being part of the agreement by which the gas companies obtained the statutory power of districting the metropolis, the Beckton Gas-Works of The Gaslight and Coke Company not being interfered with."

Dr. Letheby, the chief gas engineer appointed by the Board of Trade, has recently reported on the quality of the gas supplied to the metropolis by the companies which are under the obligations of the Gas Acts of 1869 and 1870; and the following are the maximum, minimum, and average illuminating power for the quarter:—

Illuminating Power in Standard Sperm Candles.

		Max.	Min.	Aver.
Imp. Chartered Com. Company.	Common gas, Beckton	18·8	16·3	17·46
	,, Cannon Street	17·5	15·3	16·58
	,, Friendly Place	17·9	16·7	17·29
	Cannel gas, Millbank	23·0	20·3	21·54
	,, Ladbroke Grove	22·5	20·0	21·16
	Common gas, Carlisle Square	18·5	16·6	17·51
	,, Camden Street	17·9	15·1	16·78
	,, Graham Road	18·8	15·1	16·51
South Metropolitan Company, common gas		18·0	16·5	17·15

Excepting on one occasion at Cannon Street, the gas of all the companies has been considerably above the requirements of the Acts of Parliament. With respect to impurity Dr. Letheby reports that the gas of the Chartered Company at each of the testing-places, except that at Millbank, has been constantly free from sulphuretted hydrogen; but that the gas of the Imperial Company and of the South Metropolitan Company has occasionally been charged with sulphuretted hydrogen, caused accidentally by the new arrangements for fulfilling the conditions of the referees as regards a smaller amount of sulphur. The amounts of this impurity have been as follows:—

Grains of Sulphur per 100 Cubic Feet of Gas.

		Max.	Min.	Aver.
Imp. Chartered Com. Company.	Common gas, Beckton	14·6	10·4	12·44
	,, Cannon Street	19·3	9·7	12·02
	,, Friendly Place	27·9	7·8	13·77
	Cannel gas, Millbank	29·0	11·6	19·27
	,, Ladbroke Grove	22·5	15·5	17·78
	Common gas, Carlisle Square	41·1	9·8	18·09
	,, Camden Street	33·5	6·9	12·27
	,, Graham Road	26·8	10·3	17·80
South Metropolitan Company, common gas		35·3	12·0	22·87

The proportion of ammonia in the gas has not at any time exceeded 2·5 grains per 100 cubic feet.

METROPOLIS WATER SUPPLY.

The Registrar-General publishes the following returns, furnished to him by the London water companies, of the average daily quantity of water supplied for the month of August, 1873. According to their returns, 126,240,210 gallons or 573,567 cubic metres of water (equal to about as many *tuns* by measure, *tons* by weight) were supplied daily; or 250·0 gallons (113·6 decalitres), rather more than a *ton* by weight, to each house, and 35·2 gallons (16·0 decalitres) to each person. According to the returns of the London water companies made to the select committee on East London Water Bills (session 1867), it is estimated that during the year 1866 about 82 per cent. of the total supply of water for all purposes was for domestic use. Applying this proportion to the total quantity supplied daily in the month of August, 1873, it may be estimated that about 103,516,972 gallons were probably used for domestic purposes, or about 28·9 gallons per day for each inhabitant, against 27·1 in the corresponding month of last year. This proportion no doubt varies from month to month, but the Registrar-General has no means of giving a more exact estimate.

Companies.	Number of Houses, &c., supplied in Aug., 1872.	Aug., 1873.	Aver. Daily Supply of Water in Gallons* during Aug., 1872.	Aug., 1873.
Total supply	498,161	504,905	116,679,344	126,240,210
From Thames	232,262	236,806	60,169,344	65,439,555
,, Lea and other Sources	265,899	268,099	56,510,000	60,800,655
Thames.				
Chelsea	28,154	28,270	9,642,000	8,834,500
West Middlesex	43,767	44,968	10,201,569	10,546,916
Southwark and Vauxhall	78,962	79,461	16,459,434	19,445,131
Grand Junction	33,013	34,243	11,828,821	12,733,808
Lambeth	48,366	49,864	12,037,520	13,879,200
Lea and other Sources.				
New River	120,437	121,477	28,038,000	28,537,000
East London	104,196	104,481	21,200,000	25,071,950
Kent	41,266	42,141	7,272,000	7,191,705

* Including that for manufactures and for various purposes other than for domestic consumption.

Note.—The return for August, 1873, as compared with that for August, 1872, shows an increase of 6744 houses, and of 9,560,866 gallons in the daily supply of water.

Dr. Frankland, F.R.S., in his report for the month of September, states that the water delivered by the West Middlesex, Grand Junction, Lambeth, New River, and East London Companies was considerably superior in quality to that supplied in August, but that the water drawn from the mains of the Chelsea and Southwark Companies was inferior on account of inefficient filtration. Living organisms were found in the Southwark water. "With a visitation of epidemic cholera threatening us, careful filtration is of the utmost importance, being the only defence we possess against the diffusion of zymotic matter from the towns draining into the Thames and Lea above the intakes of the water companies." Taking the amount of organic impurity contained in a given volume of the Kent Company's water as unity, the proportional amount in an equal volume of water supplied by each of the other metropolitan companies was—New River, 1·1; West Middlesex, 2·1; East London, 2·2; Chelsea, 2·3; Southwark and Grand Junction, 2·4; and Lambeth, 2·9.

The following are the returns of the Society of Medical Officers of Health relating to the composition and quality of the metropolitan waters, in September, 1873:—

Names of Water Companies.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen. As Nitrates, &c.	Nitrogen. As Ammonia.	Hardness. Before Boiling.	Hardness. After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	...	...	...	...	...	...
West Middlesex	17·03	0·034	0·098	0·001	13·5	3·6
Southwark and Vauxhall	17·10	0·039	0·106	0·002	13·5	3·3
Chelsea	17·56	0·041	0·125	0·001	14·0	3·3
Lambeth	17·57	0·046	0·104	0·002	13·8	3·3
Other Companies.						
Kent	28·17	0·004	0·196	0·000	21·8	5·6
New River	17·17	0·023	0·110	0·000	13·6	3·0
East London	16·83	0·038	0·126	0·002	13·5	3·0

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was very slightly turbid—namely, in those of the Southwark and Vauxhall and the Lambeth Companies. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Society of Medical Officers of Health, 126,240,210 gallons; and the number of houses supplied was 504,905. This is at the rate of 37·7 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 24·9 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne.

Hy. Letheby, M.B.

Dr. Whitmore's report on the composition of the Thames companies and other waters as supplied in Marylebone:—

August, 1873.	Total Solid Matter in degrees or grains per Imperial gallon. Aug., 1872.	Aug., 1873.	* Loss by incineration of Solid Matter in previous column. Aug., 1872.	Aug., 1873.	Hardness before boiling in degrees.	Hardness after boiling in degrees.
Distilled Water	0°	0°	0°	0°	0°	0°
West Middlesex water	17·14	13·02	0·70	0·82	13·81	3·00
Grand Junction water	16·98	13·64	0·70	0·84	13·96	3·04
September, 1873.	Sept., 1872.	Sept., 1873.	Sept., 1872.	Sept., 1873.		
Distilled Water	0°	0°	0°	0°	0°	0°
West Middlesex water	16·94	17·20	0·68	0·76	12·10	2·95
Grand Junction water	17·04	18·56	0·72	0·88	12·74	3·04

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

During the months of August and September the water supplied to this parish by both the water companies was clear and transparent, and during the latter month it was especially so. There was also a reduction both of the solid and organic matter in the latter month.

Major Bolton in his report on the water supplied to the metropolis states that during the month of September the state of the river Thames at Hampton, Molesey, and Sunbury, where the intake of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London Companies are situated, was good during the whole of the month. The highest flood state of the river at Hampton during the month was 7 inches above the (6 feet) summer level, and the lowest 1 inch below. At Ditton (where the Chelsea Company now alone draws it supply) the state of the water in the river was good during the whole of the month. The highest state of the flood water at this place was 6 inches, and the lowest 2 inches above summer level. The highest temperature of the water during the month was 63°, and the lowest 56°, while the highest temperature of the air at the same place was 70°, and the lowest 49°. These observations were made daily at 9 a.m. The rainfall during the month was 2·35 inches.

Castle Donnington Gas and Coke Company.—A general meeting of shareholders was held on Wednesday, Oct. 8, Mr. Edward Hyatt in the chair. The report of the directors, which was submitted, stated that during the past year the heavy rains had increased the springs round the works, and that considerable expense had to be incurred in drainage. In consequence of the enormous loss of gas through the defective state of the mains, the services of Mr. Evans, of Derby, gas engineer, had been engaged, and the directors, acting upon his advice, had relaid mains of an increased size throughout the town and secured re-connexion, and relaid the services. During the year the mains had been continued from Messrs. Watson and Son's silk mill to the railway station. The cost of the above works exceeded £505. In addition the whole of the works had been remodelled, and eight new retorts erected, with two new purifiers. The directors had decided to charge the outlay caused by the alterations and additions to revenue rather than to capital, and to declare a dividend of 8s. per share (free from income-tax), being at the rate of 4 per cent. per annum. On the motion of Mr. Attwood the report was adopted. The retiring directors, Mr. Farmer and Mr. Joseph Sowter, were re-elected, and vacancies occasioned by the decease of Mr. James Pickering and Mr. John Webb were filled by the appointment of Edward Sutton, Esq. (Shardlow Hall), and Mr. James Bywater.

SURREY CONSUMERS GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the Terminus Hotel, London Bridge, on Monday Oct. 6th.—Mr. DUVAL in the chair.

The SECRETARY (Mr. F. P. Boddy) read the advertisement convening the meeting. The minutes of the last meeting were read and approved, and the following report and statements of account were presented:—

The directors herewith submit to the shareholders the balance-sheet and accounts of the company for the half year ending June 30, 1873.

The great rise in the price of coal, which has necessitated a further increase in the charge for gas, had not come into operation during the period embraced in these accounts, but will be in force during the current half year.

The net profit for the past half year, after payment of interest upon debenture bonds, is £11,949 17s. 5d., to which is added £7121 16s. 2d. brought forward from the previous account, making together £19,071 13s. 7d. This will allow the payment of the usual dividend of 5 per cent. for the half year, and leave a balance of £8071 13s. 7d. to be carried to the next revenue account.

Dr. *Revenue Account, for the Half Year ended June 30, 1873.* *Cr.*

To Manufacture of gas—					By Sale of gas—			
Coals, including dues, carriage, unloading, and all expenses of depositing same on works	£22,103	17	1		Common gas, at 4s. per 1000 cubic feet	£31,995	9	9
Purifying materials, oil, water, and sundries at works	396	4	6		Public lighting and contracts	6,403	13	1
Salaries of engineer and officers at works	525	0	0					£38,399 2 10
Wages at works	3,861	13	1		Residual products—			
Repair and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, labour, &c.	6,259	15	4		Coke, less labour and cartage	14,818	11	11
	£33,146	10	0		Breeze	122	11	2
Less old materials sold	109	10	0		Tar	2,178	7	10
			£33,037 0 0		Liquor	350	0	0
Distribution of gas—								17,469 10 11
Salaries of inspector and clerks in Light Office	267	6	0		Rents			437 5 11
Repair, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour	2,916	0	0		Transfer fees			4 12 6
Repairing, renewing, and refixing meters	225	7	10		Rental of meters			1,032 15 0
			3,408 13 10					
Public lamps—								
Lighting and repairing			754 7 4					
Rents, rates, and taxes—								
Rents	78	8	10					
Rates and taxes	1,459	2	4					
			1,537 11 2					
Management—								
Directors allowances	750	0	0					
Salaries of secretary, accountant, office-keepers, and messengers	499	8	0					
Collectors commission and salaries	500	14	2					
Stationery and printing	154	3	3					
General establishment charges	248	2	4					
Auditors	42	0	0					
			2,194 7 9					
Law charges			272 9 1					
Bad debts			269 2 5					
Discounts			162 16 10					
Depreciation-fund			2,200 0 0					
Total expenditure			£43,836 8 5		Total receipts			£57,343 7 2
Balance carried to profit and loss account			13,506 18 9					
			£57,343 7 2					

Dr. *Capital Account, for the Half Year ended June 30, 1873.* *Cr.*

	Expenditure to Dec. 31, 1872.	Expended this Half Year.	Total to June 30, 1873.		Certified Receipts.	Received during Half Year.	Total Receipts to June 30, 1873.
To Expenditure	£270,165 16 5	£18,000 0 0	£288,165 16 5	By Ordinary shares of £10 each	£150,000 0 0	...	£150,000 0 0
				Ditto shares of £10 each, £7 paid	69,989 0 0	£3 0 0	69,992 0 0
				Mortgages and bonds	55,660 0 0	4,000 0 0	59,660 0 0
				Balance			8,513 16 5
			£288,165 16 5				£288,165 16 5

Dr. *Profit and Loss Account, for the Half Year ended June 30, 1873.* *Cr.*

To Interest on mortgages and bonds, to June 30, 1873			£1,557 1 4	By Balance of net profit brought from last account	£18,121	5	2	
Balance of net profit to be carried to next account, subject to half year's dividends, to June 30, 1873			19,071 13 7	Less dividend paid for the half year ended Dec. 31, 1872	10,999	9	0	
							£7,121 16 2	
				Balance brought from Revenue Account being profit for half year to June 30, 1873			13,506 18 9	
			£20,628 14 11				£20,628 14 11	

Dr. *General Balance-Sheet, June 30, 1873.* *Cr.*

To Profit and Loss Account—				By Cash at bankers		£12,400	18 6
Balance of credit thereof		£19,071	13 7	Coals, for stock on hand, June 30, 1873		150	0 0
Unpaid dividends		202	10 6	Gas-rental—			
Sundry tradesmen and others, for amount due for coals, stores, &c., to June 30, 1873		15,805	18 0	Balance of this account due to the company on June 30, 1873, less deposits and prepayments		14,228	13 8
Depreciation-fund		3,300	0 0	Coke and other residuals		2,759	15 8
				Sundry accounts		205	10 4
				Balance of capital account		8,513	16 5
				Cash in office		121	7 6
		£38,380	2 1			£38,380	2 1

The CHAIRMAN, in moving the adoption of the report, expressed his deep regret at the absence, through indisposition and domestic affliction, of Mr. Pocock, the chairman of the company. Referring to the business of the last half year, he remarked that the company had gone on as pleasantly and comfortably as could well be expected, considering the difficulties under which they, in common with all gas companies, were working. The labour question had been a very pressing matter, and the extraordinary state of the coal market had caused serious anxieties to those who had the charge of gas affairs. The directors had felt compelled to raise the price of gas to their consumers, which was quite in opposition to their desires and inclination, but they had no alternative. The balance-sheet now presented was, upon the whole, a very favourable one, and if on the next occasion the shareholders found it was not so satisfactory, they must not blame the directors. No one felt the effects of the high price of coal so much as gas companies: but fortunately for this company the effects were not so keenly felt by them in the last half year as by many others. They had contracts for coal at 18s. 9d. per ton which did not expire till June, so that the recent advances in price did not interfere with the six months working. But when he stated that whereas the June account for coal amounted to something like £2000, the July account exceeded £7000 for the same quantity, the shareholders would no doubt be startled. And therefore it was he made the observation that in all probability the directors would not be in a position to show so good a balance-sheet on the next occasion. Then, again, there was the labour question. In the spring of the present year the directors commenced making great alterations at the works, hoping and believing that they would be all completed by the month of September. But owing to the state of the labour market throughout the country, and also to the difficulty of getting iron, he was sorry to state that the completion would be considerably delayed. The engineer told him that instead of having his new retorts already in place, he questioned whether he should get any portion of them before the latter end of November. In fact, only those who had the management of undertakings of this sort could have any idea of the difficulties to be met and overcome. It would not be right, however, to look only at the dark side of affairs, and therefore he would just refer to the rise which had taken place in the residual products, but for which the company could not have realized the profits shown in the accounts. During the last half year the amount received for residual products was double that received in the corresponding half of 1872, and it was well it should be so, considering the enormous increase in the cost of coals to which under their new contracts the company would be put. He could only hope that the high price of coal would not long continue. The directors would do all in their power to carry on the concerns of the company with efficiency, and when the time arrived that they could feel justified in making a reduction in the price of gas, they would gladly embrace the opportunity to do so.

Mr. NICHOLSON seconded the motion, which was put, and carried unanimously.

The CHAIRMAN moved—"That a dividend of 5 per cent. for the half year ending the 30th of June last be now declared, payable on and after the 13th of October.

The motion was seconded and carried, and a cordial vote of thanks was given to the directors for their continued attention to the interests of the company.

The CHAIRMAN acknowledged the vote, and said the directors fully appreciated the kind recognition of their services by the shareholders, and that it was an encouragement to them in the prosecution of their duties.

On the motion of Mr. POWELL, a vote of thanks was accorded to Mr. Finlay, the engineer.

The CHAIRMAN, in putting the motion, said he believed no one better than himself could justify such a vote. He was sure that a more energetic and more practical man than Mr. Finlay was not to be found in any company in London. He was always at his post, always striving to the utmost to serve the company, and he well deserved the thanks of the shareholders.

Mr. FINLAY, in reply, expressed his obligations for the kind manner in which the vote had been proposed and adopted, and in the course of his remarks, alluding to the price of coals, he said the advance had been something like 10s. per ton as compared with last half year, which amounted to about £13,000. But there was a bright side to the question, which must not be overlooked. The company's contracts for coke had all run out, and the lowest price at which he had sold coke for the last half year on contract was 22s. as compared with the former price of 14s., so that he was greatly in hope the returns for residuals would go far to compensate for the large coal bills.

The CHAIRMAN proposed a vote of thanks to the secretary, which was seconded by Mr. FRANKLIN, and unanimously adopted.

Mr. BODDY acknowledged the vote, and said he had had the pleasure to attend the meetings of the shareholders for many years, but he believed that notwithstanding all the difficulties of the coal and labour questions to which reference had been made, he never knew a period when the company was in a more safe, healthy, and satisfactory state than at the present time.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the London Tavern, on Monday, Oct. 6—THOMAS BRIDGE SIMPSON, Esq., in the chair.

The SECRETARY (Mr. G. Livesey) having read the advertisement convening the meeting, the seal of the company was affixed to the register of shareholders, and the minutes of the last meeting were read and approved.

The following report was presented:—

The directors have again the pleasure of presenting a favourable report.

A moiety of the coals used in the past half year was supplied at the lower prices of the contracts of 1872, and the additional cost of the other moiety has been nearly met by the additional receipts on the sales of products.

An increase of business, coupled with great care in working, has realized an amount of profit fully sufficient to pay the usual dividend.

Under these circumstances it has been a source of great satisfaction to the directors that they have not been compelled to raise the price of gas.

The new retort-house and coal stores, mentioned in the last report as necessary to enable the company to meet the expected demand for gas in the coming winter, are progressing satisfactorily, and will be ready for use when required.

The statement of accounts—appended to this report—shows the financial position of the company. The profit for the half year is £17,394 11s. 7d., against £14,265 16s. 9d. for the corresponding period of last year. This enables the directors to recommend the declaration of the usual dividend at the rate of 10 per cent. per annum, which will absorb £16,000.

The CHAIRMAN: In moving that the report be received and entered on the minutes, I have very few remarks to make, because the report itself furnishes all the information which it is in our power to give. I can only assure you that we have very great pleasure in meeting you on this occasion, inasmuch as we have been able to earn the dividend to which you are entitled without making any extra call upon the public by way of increase on the price of gas. I think under such circumstances we are entitled to their best thanks, and we congratulate ourselves that such has been the fact. With regard to the price of coals, you are quite aware that they still remain extremely high. What the course of events during the next half year may be it is quite impossible for us to tell, but so long as the cost of the raw material will enable us to carry on our operations without advancing the price of gas, so long shall we continue the course we are now pursuing. I believe (with one exception, that of the Plymouth Company, who charge the same price that we do) we are charging a lower price than any other company in England. We have the satisfaction to know that our undertaking is in a most excellent condition; in fact, I do not know of one which is more firmly grounded. With regard to the price of coal, which has been a considerable source of anxiety with gas companies of late, I think it is likely that prices will continue much the same as at present. I do not see any probability of a reduction taking place. Whether, in consequence, we shall be obliged to raise the price of gas, it is impossible to say; I trust we shall not be under the necessity, and we certainly shall not do so if we can avoid it. I may just remind you that the balance of our capital account is only about £10,000—that is all our working capital—and I fear we shall have to make a call upon you sooner than we intended. We propose, indeed, to make a call of 30s. per share on the 1st of November. We have driven it off as long as possible, and I had thought we should be able to go on to Christmas without being obliged to make it. But with so small a working balance, and with coals at so high a price, we think it is not prudent to go on any longer without asking you for more money. With these few remarks I now move that the report laid before the meeting be received and entered on the minutes.

Mr. R. P. JENKINS seconded the motion, which was carried unanmously.

The following statements of account were laid before the meeting:—

Capital Account, for the Half Year to June 30, 1873.

	Expended to Dec. 31, 1872.	Expended this Half Year.	Total expended to June 30, 1873.
	£ s. d.	£ s. d.	£ s. d.
To Amount expended to Dec. 31, 1872	293,948 5 11	..	293,948 5 11
Manufacturing plant	..	12,852 7 10	12,852 7 10
New meters and fixing	..	310 1 9	310 1 9
New mains and laying	..	2,152 1 11	2,152 1 11
Balance	..	..	10,787 2 7
	£293,948 5 11	£15,314 11 6	£320,000 0 0

	Certified to Dec. 31, 1872.	Received this Half Year.	Total to June 30, 1873.
	£ s. d.		£ s. d.
By Shares, at £50 each	200,000 0 0	..	200,000 0 0
Do., at £12 10s. each	50,000 0 0	..	50,000 0 0
Do., at £12 10s. each, £3 10s. paid	70,000 0 0	..	70,000 0 0
	£320,000 0 0	..	£320,000 0 0

Revenue Account, June 30, 1873.

Dr.		Cr.	
To Coals	£42,745 19 10	By Gas at 3s. per 1000 feet	£45,535 17 6
Purifying material, &c.	686 10 9	Public lighting 3508 lamps	6,582 14 11
Salaries, engineer and officers at works	485 15 10	Coke, less labour loading	24,395 4 0
Wages	7,873 9 7	Breeze	681 9 6
Repairs & maintenance, less old materials sold	1,970 16 8	Tar	1,726 11 11
Repair and renewal of mains, &c.	1,502 14 0	Liquor	2,782 6 3
Salary of clerks and inspectors	1,396 13 6	Rents	161 11 4
Repairing and renewing meters	817 1 2	Transfer fees	3 10 0
Lighting and repairing lamps	1,458 13 10	Other items	513 5 4
Rent	284 7 6		
Rates and taxes	2,004 13 11		
Directors, £600, less £8 15s. income-tax	591 5 0		
Auditors, £50, less 14s. 7d.	49 5 5		
Salary, secretary and clerks	800 0 0		
Collectors commission	1,053 8 4		
Stationery and printing	134 16 8		
General charges	464 11 3		
Superannuation-fund	75 12 0		
Gas referees, Board of Trade auditor, &c.	58 5 0		
Bad debts and allowance	500 0 11		
Loss on sale of 3 per Cents.	33 18 0		
Balance (profit)	17,394 11 7		
	£82,382 10 9		£82,382 10 9

Balance-Sheet, June 30, 1873.

Dr.		Cr.	
To Balance of capital	£10,737 2 7	By Consols, reserve-fund	£20,000 0 0
Reserve-fund	20,000 0 0	Do., renewal-fund	8,875 3 3
Leasehold renewal-fund	8,875 3 3	Cash at bankers	17,302 3 7
Profit and loss account	34,567 8 4	Do. in hand, for freight accounts, &c.	600 0 0
Sundry creditors	7,667 11 6	Stocks—	
Deposits	2,156 2 0	Coals	11,778 1 8
Property-tax account	10 3 9	Coke and breeze	675 0 0
		Tar and liquor	281 17 6
		Mains and meters	3,937 6 7
		Amount due for—	
		Gas	19,246 16 6
		Products	885 19 10
		Sundries	113 0 2
		Interest	318 2 4
	£84,013 11 5		£84,013 11 5

Appropriation of Balance.

Dr.		Cr.	
Balance brought forward from last account	17,172 16 9	Dividend on £320,000 at 10 per cent. per annum	16,000 0 0
Balance profit from revenue account	17,394 11 7	Balance to be carried to next account	18,567 8 4
	£34,567 8 4		£34,567 8 4

The CHAIRMAN moved—"That the accounts be received."

Mr. HOBSON seconded the motion, and asked what was the maximum sum the company were allowed as a reserve-fund. The present reserve appeared to be £20,000.

The SECRETARY said that was the full amount the company were allowed until their capital was £400,000, from which time it might be increased at the rate of 5 per cent.

Mr. HOBSON remarked that formerly the statutory reserve was 10 per cent. of the capital, and he was director of a provincial company which had a right to that maximum.

Mr. DREW: And have you raised it?

Mr. HOBSON: We have now 9 per cent of our capital.

The motion was put and carried.

Mr. H. T. JENKINS moved—"That a dividend at the rate of 10 per cent. per annum be now declared and made payable on the 9th inst., and that the warrants be transmitted to each proprietor by post."

Mr. C. B. HARRIS seconded the motion, which was put and carried.

Mr. R. A. GRAY: I think, gentlemen, you will all agree with me that the affairs of our company are very admirably managed. I wish I could say as much for many other companies; but sufficient for my purpose to say that I think the directors of the South Metropolitan are deserving of our best thanks for the able manner in which they discharge their duties. My worthy friend the chairman, from the way in which he announced the call, seemed to expect that the countenance of every one present would instantly become depressed. However, the announcement appeared to be very well received, and I hope, on reconsideration, the directors may feel it advisable and convenient to make the call a little larger. We are in a proud position, and I do not know why the proprietors should not reap all the advantages to which they are entitled without injury to the public. I beg to move a vote of thanks to the directors.

Mr. C. WALLINGTON seconded the motion, which was cordially agreed to.

The CHAIRMAN: Gentlemen, during the 30 years that I have had the honour to appear here, I have invariably received your thanks for the services I, in conjunction with my colleagues, have endeavoured to render to the company. I assure you that the expression of your approval and confidence is at all times a stimulus to us, and that we do give our best attention to your interests. We are much obliged to you for this vote, and trust we shall continue to deserve your thanks. We shall certainly continue the course we have hitherto pursued in seeking to maintain the prosperity of this undertaking. In reference to the observations which have been made respecting the call, I may remind the honourable proprietor that it would not do to increase the call unless we wanted the money.

A SHAREHOLDER: The fact is we are so prosperous that I fear we may excite the envy of others, and that there may be some proposition made for an amalgamation. I trust that if any such proposition is made the directors will insist upon a guaranteed 10 per cent. and priority of calls.

The CHAIRMAN: That is just the position we occupied on the former occasion, but the arrangement was rejected by the House of Commons.

Mr. H. T. JENKINS: There is a paragraph in the report which says that an increase of business, coupled with great care in working, has realized an amount of profits fully sufficient to pay the usual dividend. Now, I have no doubt that Mr. Livesey, our secretary and engineer, has contributed to that result, and for the part which he has taken, in conjunction with the directors, I think he is entitled to our thanks. I therefore move—"That the best thanks of this meeting be given to Mr. Livesey, our secretary and engineer, for the able manner in which he has conducted the business of the company."

Mr. T. GARNAR seconded the motion, which was carried unanimously.

Mr. LIVESEY: Gentlemen, I can assure you that during the last two years my position has been one of great anxiety and responsibility. But the cordial and handsome manner in which you have always expressed your sympathy with me in my work has been a great encouragement to me, and a great consolation amid the difficulties I have had to contend with. I have endeavoured to conduct your business in a just and honest manner towards the shareholders, the public, and the workmen in our employ, and I think I am able to say, without fear of contradiction, that I have succeeded in my efforts without offence to any parties, but with satisfaction to all. I thank you sincerely for your renewed kindness, and trust I shall be able to continue to do as I have done, and that year after year we may witness the prosperity of the company.

GAS LIGHTING IN THE METROPOLIS IN 1828.—The *New Monthly Magazine* of March, 1828, says:—"In London there are at present four great gaslight companies, having altogether 47 gasometers at work, capable of containing in the whole 917,940 cubic feet of gas, supplied by 1315 retorts, and these consuming 33,000 chaldrons of coal in the year, and producing 41,000 chaldrons of coke. The whole quantity of gas generated annually being upwards of 397,000,000 cubic feet, by which 61,203 private and 7258 public or street lamps are lighted in the metropolis, besides private companies.

INDEPENDENT GAS COMPANY.—The half-yearly meeting of this company was held on Wednesday last, at the London Tavern—Mr. Brickwell in the chair. The report stated that the gross receipts for the half year, including £39,243 from the sale of gas and £22,776 from the value of residual products, amounted to £63,846, and the expenditure to £47,843, leaving a net profit of £16,003. Out of this the directors declared dividends on the £40 A shares and on the £10 D shares at the rate of 10 per cent. per annum, on the £10 B shares at the rate of 5 per cent. per annum, and on the £20 C shares at the rate of 7½ per cent. per annum. The chairman said that only a small proportion of the coals consumed during the half year was purchased at the present high prices, and it was owing to that circumstance that the profits on the half year had been so large. At Midsummer last the directors increased the price of gas from 3s. 2d. to 3s. 6d. per 1000 cubic feet, and it was possible, should the present high price of coal continue permanent, a still further increase would have to be made. The report was adopted. Mr. Brickwell and Mr. Smith, the retiring directors, were re-elected, and also Mr. Cobham, the retiring auditor.

LONDON GASLIGHT COMPANY.

The Ordinary Half-Yearly Meeting of Proprietors was held at the Freemasons Tavern, on Wednesday, Oct. 15—JOHN ROBERT HALL, Esq., the Governor, in the chair.

The SECRETARY (Mr. A. J. Dove) read the advertisement convening the meeting, and the corporate seal having been affixed to the register, the following report and statements of account were presented:—

Annexed to this report, your directors submit the half-yearly accounts, showing the result of manufacture and distribution of gas up to June 30, 1873. After appropriating £750 to the redemption-fund, in accordance with the provisions of the London Gaslight Act, 1857, the sum of £30,792 8s. 1d. remains applicable to dividend. Out of this sum, the directors recommend that dividends be declared on all classes of preference stocks and shares, and also a dividend at the rate of 10 per cent. per annum on the ordinary stock. Such dividends to be paid on Oct. 15, 1873.

The increase in the rental for gas, and in the prices obtained for the residual products of manufacture during the half year, have met the increased cost of coal, the pressure of which, however, has only been felt during a portion of the period to which the accounts have reference.

One of the largest gasholders is at present undergoing reconstruction at considerable cost, a part of which cost is included in the accounts presented. The whole of the plant is otherwise in an efficient state; and the new gasholder, referred to in the last report, has been completed, and brought into action.

After payment of the dividends proposed to be declared at the meeting, £1099 10s. 5d. will remain to be added to the reserve-fund.

Various processes for effecting improvements in gas manufacture have from time to time been brought to the notice of the board, but none of these have yet been sufficiently tested so as to commend them for adoption.

The directors deeply regret the loss by death of one of their colleagues, Mr. George Hallett, who was long connected with the company. The vacancy thus occasioned has been filled by the election of the Hon. Henry Noel.

A.—STATEMENT OF STOCK AND SHARE CAPITAL, *on June* 30, 1873.

1. Acts of Parliament authorizing the Raising of Capital.	2. Description of Capital.	3. Maximum Dividend authorized.	4. Number of Shares issued.	5. Nominal Amount of Share.	6. Called up per Share.	7. Total paid up.	8. Amount issued but not paid up.	9. Remaining to be issued.	10. Total Amounts authorized.
15 Vict., cap. 82	Ordinary stock.	10 per cent.	Stock	Stock	Stock	£378,350	..	..	£378,350
	2nd pref. ,,	6 ditto.	Do.	Do.	Do.	14,450	..	..	14,450
	3rd ditto ,,	6 ditto.	Do.	Do.	Do.	4,350	..	..	4,350
	1st ditto ,,	6 ditto.	Do.	Do.	Do.	150,000	..	..	150,000
29 Vict., cap. 55	A ditto shares	6 ditto.	7622	£25 0 0	£12 10 0	147,930	£42,620	£109,450	300,000
20 & 21 Vict., cap. 73	Debenture stks.	5 & 6 ditto.	Stock	Stock	Stock	27,750	..	..	27,750
						£722,830			

B.—STATEMENT OF LOAN CAPITAL, *on June* 30, 1873.

1. Acts of Parliament under which borrowed.	2. Description of Loan.	3. Rate per Cent. of Interest.	4. Total Amounts borrowed at June 30, 1873.	5. Remaining to be borrowed.	6. Total Amounts authorized.
15 Vict., cap. 82	Bond, &c.	4½ and 5.	£91,667	..	£91,667
29 Vict., cap. 55	Ditto	Do.	37,525	£51,332	100,000
			£129,192		

Total stock and share capital paid up (*see* A), £722,830; ditto loan ditto borrowed (*see* B), £129,192; total capital received, £852,022.

C.—CAPITAL ACCOUNT, *for the Half Year ended June* 30, 1873.

Dr. *Cr.*

		Total to June 30, 1873.
1. To Expenditure, to Dec. 31, 1872		£796,621 6 1
Since that date—		
2. New buildings, manufacturing plant, machines, storeage works, and other structures connected with manufacture	£2,252 18 3	
3. New mains and service-pipes, including laying same, paving, and other works connected with distribution	362 1 5	
	£2,614 19 8	
4. Less excess in meters returned to store	365 19 9	
		2,248 19 11
		£798,870 6 0
5. Balance		12,700 2 6
Total expenditure		£811,570 8 6
To balance of capital account		40,451 14 0
		£852,022 2 6

	Certified Receipts to Dec. 31, 1872.	Received during Half Year.	Total Receipts to June 30, 1873.
1. By Ordinary stock	£378,350 0 0	..	£378,350 0 0
2. 2nd Preference ditto	14,450 0 0	..	14,450 0 0
3. 3rd ditto ditto	4,350 0 0	..	4,350 0 0
4. 1st ditto ditto	150,000 0 0	..	150,000 0 0
5. A ditto shares, £25 each, including amount received in anticipation of calls	144,362 10 0	£3,067 10 0	147,930 0 0
6. Debenture stocks, under 20 & 21 Vict., cap. 73	27,858 17 6	*	27,750 2 6
7. Bonds and other loans	109,992 0 0	†19,200 0 0	129,192 0 0
	£829,863 7 6	..	£852,022 2 6

Note * £108 15s. redeemed.
† £300 ditto.

D.—REVENUE ACCOUNT, *for the Half Year ended June* 30, 1873.

Dr. *Cr.*

To Manufacture of gas—		
1. Coals, including dues, carriage, unloading, and all expenses of depositing same on works	£61,833 5 7	
2. Purifying materials, oil, water, and sundries at works	603 13 4	
3. Salaries of engineers, including chief engineer, superintendents, and officers at works	1,563 11 6	
4. Wages and gratuities at works	11,279 4 2	
5. Repairs and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour	14,699 4 0	
	89,978 18 7	
Less old material sold	41 14 3	
		£89,937 4 4
5A. The Gaslight and Coke Company, for cannel gas		6,113 13 3
Distribution of gas—		
6. Salaries of surveyor, chief inspector, inspectors, assistant inspectors, and clerks in Light Office	1,822 10 0	
7. Repair, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour	3,142 2 4	
8. Repairing, renewing, and refixing meters	1,645 18 11	
		6,610 11 3
Public lamps—		
9. Lighting and repairing		1,379 2 2
Rents, rates, and taxes—		
10. Rents	898 1 6	
11. Rates and taxes	3,088 8 5	
		3,986 9 11
Management—		
12. Directors allowances	900 0 0	
13. Salaries of secretary, accountant, and clerks, office-keepers, and messengers	831 4 0	
14. Collectors commission and salaries	1,686 10 8	
15. Stationery and printing	409 16 3	
16. General establishment charges and incidentals	415 4 1	
17. Company's auditors	50 0 0	
		4,292 15 0
Law and parliamentary charges—		
18. Law	81 4 1	
19. Parliamentary (oppositions)	..	
		81 4 1
20. Depreciation-fund for works on leasehold lands		100 0 0
21. Bad debts		481 1 3
22. Repairs of houses		177 18 3
Total expenditure		113,159 19 6
Balance carried to profit and loss account (E)		34,349 2 6
		£147,509 2 0

By Sale of gas—		
1. Common gas (426,831,200 cubic feet), at 3s. 9d. and 4s. 6d. per 1000 cubic feet	£35,264 14 10	
2. Cannel gas (23,063,100 cubic feet), at 5s. and 6s. per 1000 cubic feet	6,702 8 6	
3. Public lighting and under contracts (common and cannel gas)	10,307 11 4	
		£102,274 14 8
4. Rental of meters		1,878 17 9
		104,153 12 5
By Residual products—		
5. Coke, less labour and cartage	32,120 1 3	
6. Breeze, ditto	1,288 3 10	
7. Tar, ditto	5,157 4 5	
8. Ammoniacal liquor, ditto	3,269 18 7	
		41,835 8 1
9. Rents		1,510 1 6
10. Transfer fees		10 0 0
Total receipts		£147,509 2 0

E.—PROFIT AND LOSS ACCOUNT (NET REVENUE), *for the Half Year ended June 30, 1873.*

Dr.			*Cr.*		
1. To Amount carried to reserved fund account (F) from profits, to Dec. 31, 1872	£401	0 7	1. By Balance of net profit brought from last account	£29,317	8 11
2. Interest on temporary loans and bonds	£3,032	9 2	Less dividend paid for the half year ended Dec. 31, 1872	28,916	8 4
3. Redemption-fund, reserve per London Gaslight Act, 1857	750	0 0			£401 0 7
Balance of net profit to be carried to next account, subject to half year's dividends	30,792	8 1	2. Balance brought from revenue account (D), being profit for the half year, to June 30, 1873		34,349 2 6
			3. Interest on moneys deposited		225 14 9
	£34,975	17 10			£34,975 17 10

F.—RESERVED FUND ACCOUNT, *for the Half Year ended June 30, 1873.*

Dr.			*Cr.*		
To Balance	£20,493	17 6	1. By Balance brought from last account		£19,784 16 4
			2. Amount brought from profit and loss account (E)		401 0 7
			3. Interest on amount invested		308 0 7
	£20,493	17 6			£20,493 17 6

G.—DEPRECIATION-FUND ACCOUNT (for Works on Leasehold Lands), *for the Half Year ended June 30, 1873.*

Dr.			*Cr.*		
To Balance	£900	0 0	1. By Balance brought from last account		£800 0 0
			2. Amount brought from revenue account (D)		100 0 0
	£900	0 0			£900 0 0

H.—STATEMENT OF COALS, *during the Half Year ended June 30, 1873.*

Description of Coal.	In Store, Dec. 21, 1872.	Received during Half Year.	Carbonized or used during Half Year.	In Store, June 30, 1873.
	Tons.	Tons.	Tons.	Tons.
Common	3,343	57,510	50,368	10,485
Cannel	1,768	3,493	3,578	1,683

I.—STATEMENT OF RESIDUAL PRODUCTS, *for the Half Year ended June 30, 1873.*

Description of Residual.	In Store, Dec. 31, 1872. Estimated.	Made during Half Year. Estimated.	Used in Manufacture during Half Year. Estimated.	Sold during Half Year.	In Store, June 30, 1873. Estimated.
Coke—Common, Cannel	chaldrons, 36 bush.	2,440	48,949	9,260	41,671	458
Breeze	chaldrons.	470	7,107	630	6,892	55
Tar	gallons.	164,000	544,202	..	635,202	73,000
Ammoniacal liquor	butts of 108 g.	2,296	10,080	..	11,024	1,352

J.—GENERAL BALANCE-SHEET, *on June 30, 1873.*

Dr.			*Cr.*			
1. To Capital account—Balance at credit thereof (Account C)	£40,451	14 0	1. By Cash at bankers, and in hand			£18,975 12 11
2. Profit and loss account—Balance at credit thereof (Account E)	30,792	8 1	2. Ditto on deposit or at interest			20,000 0 0
3. Reserved fund account—Balance at credit thereof (Account F)	20,493	17 6	3. Coals—for stock on hand	£20,493	2 9	
4. Depreciation-fund account (for works on leasehold lands)—Balance at credit thereof (Account G)	900	0 0	4. Coke and breeze—ditto	395	11 9	
5. Redemption-fund	926	0 6	5. Tar and other products—ditto	1,233	3 1	
6. Unpaid dividends	3,450	2 10	6. Sundry stores—ditto	4,463	18 3	
7. Interest accrued and unpaid on bonds and other loans	1,681	8 5				26,585 15 10
8. Sundry tradesmen and others, for amount due for coals, stores, &c.	39,659	7 8	7. Gas and meter rental—balance of this account due to the company, less deposits and pre-payments	41,213	10 2	
			8. Coke and other residuals—balance of these accounts due to the company	10,967	12 7	
			9. Sundry accounts	519	10 7	
						52,700 13 4
			10. Investment account			20,092 16 11
	£138,354	19 0				£138,354 19 0

The GOVERNOR: Gentlemen, it becomes my duty to move—"That the report of the directors and the accounts now laid before the meeting be received and adopted." The balance-sheet is made out in the form required by the legal authority, and contains a full and detailed account of the affairs of the company. It has been duly audited by the auditors, and states so clearly everything connected with the proceedings of the last half year, that it leaves me very little to comment upon in moving the adoption of the report. It is brought home to every householder that the price of coal has greatly increased. We feel this, of course, in common with every individual who has to deal with coal, but, as we tell you in the report, the increase in the rental for gas, and in the prices obtained for the residual products of manufacture during the half year, have met the increased cost of coal, the pressure of which, however, has only been felt during a portion of the period to which the accounts have reference. We had a contract for coals up to the end of May, and as we obtained an increased price for products during the whole of that period from the 1st of January, we had a considerable relief from the pressure of the advance in the last six months. The price of gas was increased from the 1st of April, and we trust to be able to go on as hitherto, paying the largest dividend the law empowers us to pay. There is one paragraph in the report to which I may refer, as probably some of our shareholders may have thought the directors were asleep respecting the matter; but I assure you it is not so. We say that "various processes for effecting improvements in gas manufacture have from time to time been brought to the notice of the board, but none of these have yet been sufficiently tested so as to commend them for adoption." There have been, as we say, many such schemes, and I think so long ago as 25 years, when I was chairman of the board, there was a plan proposed for making gas at a cheap rate out of water. However, it was found that the difficulties were so great that the plan could not be adopted. Since then a variety of other plans have been brought forward, and there is a gentleman living in my own parish who is reported to have brought out one by which he obtained £70,000 or £100,000, and the concern is being wound up for want of success. We feel, therefore, that it is better to be rather behind than to be forward in speculating in any new processes. The moment we find anything tangible, and by which improvements can be effected in the manufacture of gas, you may rely upon it we shall be alive to our duty, and shall take the plan into our serious consideration. In the meantime, we do not think it desirable that our works should be subject to speculation, and would rather be behindhand in adopting any so-called improvements. I am not prepared to say that, as time goes on, something may not be done which will be of advantage in this direction. The public, knowing the increased cost of coal, are contented, so far as we have any experience, to pay an increased price for gas, and so we trust we shall continue, as we have hitherto done, to maintain for you the dividends to which you are entitled, and to keep up our works in an efficient condition. I need scarcely say that daily attention is required in the conduct of these affairs, and that that care is given to them. We cannot supply from 16,000 to 20,000 consumers with gas, without from time to time, having some complaints, but not one of these complaints ever come before us without being dealt with in the best way we can, and we furnish every facility for an increased supply when that can be done without loss to the company and with benefit to the consumers. Under these circumstances, I trust we shall be able to maintain the high position which we have held in the manufacture and delivery of gas for so many years. Having made these observations, I believe it will not be necessary to say more than that if any gentleman has remarks to make upon the report, we shall be happy to hear them. In the meantime, I move—"That the report be received and adopted."

Mr. RHODES seconded the motion.

Mr. FORD inquired how long the newly appointed director had been a shareholder in the company.

The GOVERNOR, on referring to the register, replied for more than a year.

Mr. FORD asked the amount of Mr. Noel's holding.

The GOVERNOR said that was not a question which a shareholder was entitled to ask. The Act of Parliament required that a register of the shareholders should be kept, and be open for inspection, but it was not competent to one shareholder to inquire into the holding of another shareholder.

The Hon. A. KINNAIRD said a certain amount of interest in the company was a necessary qualification for a seat at the board. Mr. Noel had that interest, which was all that Mr. Ford could require to know.

Mr. FORD thought that a gentleman who had so recently become a shareholder ought not to have been elected to fill the vacancy at the board in preference to a shareholder who had been for many years connected with the company, and who, in addition to his pecuniary qualification, was otherwise well fitted for the post. During the last three years there had been three vacancies, and all had been filled up by the directors, without reference to the shareholders. He was not himself a candidate for office, but he had heard it stated that the senior auditor, who was a large shareholder, had intimated his desire to be put in nomination, and he thought the claims of that gentleman ought to have received the careful consideration of the directors.

The CHAIRMAN replied that the directors, in filling up vacancies, always had regard to the special fitness of the individuals whose names came before them, and in the appointment of Mr. Noel, as in their previous selections, they had acted on that principle. They believed that in his position Mr. Noel could be of great service to the company, and they were not influenced by any personal considerations in the matter. If they had not filled up the vacancy it would not have been in the province of this meeting to do so. Mr. Noel was elected to fill the place of the late Mr. Hallett during the remainder of the term for which that gentleman would have been a director had he lived, and it would then be open to the shareholders to propose the name of any one they thought right. The directors would not for a moment attempt to usurp the power possessed by the shareholders, but as trustees for the great body of proprietors, many of whom never attended the meetings of the company, they felt the responsibility of acting to the best of their judgment in making appointments to vacancies which it was their province to fill.

The motion was put, and carried unanimously.

The GOVERNOR moved—"That the following dividends be declared, viz.:—

The fixed dividends on all classes of preference stocks and shares, and a dividend at the rate of 10 per cent. per annum on the ordinary stock for the half year ending the 30th of June, payable on the 15th inst."

The motion having been seconded, was put and carried.

On the motion of Mr. FORD, seconded by Mr. RHODES, a votes of thanks was given to the directors for their continued attention to the affairs of the company.

The GOVERNOR acknowledged the vote, and the proceedings then terminated.

PHŒNIX GASLIGHT AND COKE COMPANY.

The Adjourned Half-Yearly General Meeting of this Company was held at the Bridge House Hotel, Southwark, on Wednesday, Oct. 8—EDWARD HORNER, Esq., in the chair.

The SECRETARY (Mr. I. A. Crookenden) read the notice convening the present meeting, and the minutes of the last half-yearly general meeting, also of a special meeting held in July last for the election of a director in the place of the late Mr. Phillips, when Geo. Puckle, Esq., M.D., was appointed to fill the vacancy, and of the *pro formâ* meeting of which this was an adjournment; the seal of the company was affixed to the register of shareholders, and the following report and statements of account were submitted:—

The directors herewith submit trade account and balance-sheet to the 30th of June last.

They report that the trade account is again favourable, notwithstanding the cost of all materials in use at the several stations continues high, especially coals; there has, however, been some compensation in the increase of the rental for gas and the amount received for coke.

The two new tanks referred to in the last report have been completed, and the gasholder is in course of construction.

A call of 10 per cent. upon the new stock will be made at this meeting, payable on the 1st of November, to meet the costs of the tanks and gasholder, and other capital expenditure.

The directors report that an addition has been made to the reserved fund by the investment of £4112 16s. 2d., being the balance of profit for the year ending Dec. 31, 1872, making the amount of this fund £15,787 5s. 11d.

The net amount of the profit for the past half year is £44,753 13s. 9d., which, added to the unappropriated balance of £30,460 5s. 10d. (after paying dividends in April last), makes a total of £75,213 19s. 7d. to the credit of profit and loss, as per that account, out of which your directors recommend that dividends be declared as follows, viz.:—On the £20 divided shares, 10 per cent. per annum; on the £20 new stock, 7½ per cent. per annum; on the £20 capitalized stock, 5 per cent. per annum; less income-tax, leaving an unappropriated balance of £38,538 19s. 7d.

Abstract of the Trade Account for Six Months ending June 30, 1873.

Dr.		*Cr.*	
To Coals used	£63,027 9 4	By Rental	£114,232 16 7
Materials supplied	15,829 19 1	Coke	41,009 16 4
Meters—repairs and renewals	2,149 1 2	Breeze	372 11 7
Rates	4,324 8 10	Tar	2,863 13 9
Law charges	11 9 0	Ammonia	2,340 5 10
Directors, £1000; auditors, £50	1,050 0 0	Rents	1,593 3 0
Salaries and commission on collection	5,679 2 11	Miscellaneous receipts	652 2 10
Pensions	810 0 0	Interest	151 2 2
Wages	20,202 1 1		
Bad debts and allowances	821 7 8		
Interest on bonds	3,125 0 0		
Leasehold-fund	430 0 0		
Rents	928 16 2		
Interest	269 6 7		
Insurance	3 16 6		
Net profit	44,753 13 9		
	£163,415 12 1		£163,415 12 1

Profit and Loss.

To Reserve-fund	£4,112 16 2	January, 1873.—By balance brought forward	£71,248 2 0
April, 1873.—To dividend for half year ended Dec. 31, 1872	36,675 0 0	June 30, 1873.—By half year's profit	44,753 13 9
June 30, '73.—To balance carried forward	75,213 19 7		
	£116,001 15 9		£116,001 15 9
		July 1, 1873.—Balance brought down	£75,213 19 7

Abstract of the Balance-Sheet, June 30, 1873.

Dr.			*Cr.*	
To Capital of 27,000 £20 shares, paid in full (maximum dividend 10 per cent.)		£540,000 0 0	By amount of plant on Dec. 31 last	£909,565 9 8
Capitalized stock, paid in full (maximum dividend 5 per cent.)		144,000 0 0	Expended this half year for extension of works	8,451 15 0
New stock, £360,000, £45 per cent. paid up (maximum dividend 7½ per cent.)		162,000 0 0		£918,017 4 8
Bonds, at 5 per cent.		125,000 0 0	Investment of leasehold-fund	18,439 6 5
Unpaid dividends		119 4 3	Ditto reserve-fund	15,787 5 11
Unpaid tradesmen's bills, &c.		23,423 16 8	Amount due for rental—	
Leasehold-fund		18,439 6 5	Midsummer quarter	£40,195 1 11
Reserve-fund		15,787 5 11	Arrears	552 12 8
Balance of profit and loss—				40,747 14 7
Unappropriated balance	£30,460 5 10		Amount due for coke and breeze	£11,250 14 9
Half year's profit	44,753 13 9		Ditto tar	801 6 8
	75,213 19 7		Ditto ammonia	887 6 9
			Ditto sundries	2,751 11 6
				15,690 19 8
			Stock of coals	£10,833 3 8
			Ditto coke	341 0 0
			Ditto breeze	21 4 0
			Ditto tar	251 8 3
			Ditto ammonia	170 16 8
			Ditto retorts	669 8 6
			Ditto pipes	1,741 17 9
				14,028 13 10
			Meters	41,216 18 11
			Balance at treasurer's	20,055 3 10
			Ditto on deposit	20,000 0 0
	£1,103,983 12 10			£1,103,983 12 10

The CHAIRMAN: Gentlemen, I rise to move—"That the report and accounts be received and entered upon the minutes." In doing so I have to congratulate the proprietors upon the fact that we are still able to pay our full dividends, notwithstanding the enormous increase which has taken place in the cost of coals and other materials, and that, having paid our dividends, there will be a tolerable balance to be carried over. It is not my intention to detain you long by going through the items of the accounts, but I may simply point out to you this remarkable feature in our affairs, that this is the first time in the annals of the company that we have actually sold gas at a loss. We are now turned into a coke and ammonia producing company, inasmuch as the sale of our residual products really forms the profits of the concern. In years gone by every ton of coal produced a certain number of shillings profit from the sale of the gas we manufactured from it, but now the price of coal has become so enormously high that the sale of gas has not covered the costs of carrying on the concern, and our profits are solely derived from our sales of residual products. This is a very remarkable fact. It is to be hoped that things will come back to their original condition, for it is not desirable that we should have to trust to the fluctuations of residual products for our dividends. At the same time, looking at all the circumstances of the past half year, I think we may consider the results of our working satisfactory. The expenses of carrying on our operations during that period have increased, mainly owing to the price of iron and coal, to the extent of no less than £19,000; but this has been met by the increased price we have been able to obtain for residual products, and by the increase in our gas-rental, amounting in all to no less than £30,000. This increase being between £10,000 and £11,000 over and above the expenditure, accounts for the balance we shall have over after we have paid you the dividend, which I think you will say is very satisfactory. Still it would be more agreeable, and we should feel that we were in a safer position, if we were able to return to the normal condition of things, and get our profits out of gas-making without being dependent upon the sale of residual products as we now are. I may say here that I think the present state of this account is in a great measure due to the very excellent management of our officers. Our leakage during the past six months has been something like 3 per cent. less than it has ever been before, and, of course, in a large concern like this, with a rental of over £220,000 a year, 3 per cent. amounts to something. When you come to know that we have sold very little less than 9000 cubic feet of gas per ton of coal carbonized, I think you will agree with me that if we had to go before the Board of Trade, we should be free from any imputation of not having conducted our affairs well. Our officers, I consider, are entitled to very great credit for the manner in which they have managed the distribution of the gas. I may say the same also with regard to the sale of our coke. We have received in the half year £41,009 for coke, which is an increase of £20,399 over the corresponding half of 1872. Now, in order to get that amount, you may well suppose it has required an extraordinary degree of attention, and I must say that to our secretary, who has mainly had the management of the coke during the last six months, we are indebted for the very excellent results here shown. I have examined the coke accounts of nearly every company whose accounts are published, and I see nothing approaching to this, and I say confidently that it is chiefly owing to the careful management of this department that we have such favourable returns to lay before you to-day. I believe you are all aware that we have been working very favourably in the past as far as the coal contracts are concerned, but this has not been so much the case during the last six months, inasmuch as some of our contractors got somewhat behind, and we had to buy the quantity we required to make up the deficiency at the high rates at which coals have ruled, so that our coals have actually cost us more than they otherwise would have done. But in the next six months we shall have the advantage of this, inasmuch as the coals in arrear will be delivered, and this will somewhat reduce the cost. In the last half year our coals have averaged 19s. 4d. per ton; but during the current half year they will cost us 25s. or 26s., and we shall have something to do to make up for this additional 5s. or 6s. per ton. We can only hope the value of residual products will follow that of the main article, and that, as coal rises, coke will advance sufficiently to enable us to balance the account at the end of the six months. But although it is just possible that we may be somewhat deficient in our profits, the directors have decided that on no account will they raise the price of gas to the consumers, except under the greatest possible obligation. It is exceedingly probable that in the current half year we shall ascertain that we cannot make quite sufficient to pay our dividend, and, if so, we shall then most likely decide upon some small increase in the price of gas to cover the deficiency; but until we find that we are actually minus, we shall refrain from taxing the consumers by raising the price. I think, therefore, I may say the public are under great obligations to us, seeing that we are charging only 3s. 9d. per 1000 cubic feet in the borough of Southwark, while our neighbours right and left are charging higher prices. The public will see that while naturally anxious to pay our dividends, we are resolved to pay every attention to them that we possibly can do. I do not know that I have any further remarks to make, and therefore I will conclude by saying that I hope, if the accounts are not quite so favourable on the next occasion, you will understand it arises from the circumstance that we have had more to pay for our coals, and that our residuals have not realized so much as we expected; still, as we carry over a good balance to-day, there is nothing to prevent every shareholder seeing that he will get the same rate of dividend next time as he will receive this. I move—"That the report and accounts be received and entered on the minutes."

Mr. ROYLE seconded the motion, which was put, and carried unanimously.

The DEPUTY-CHAIRMAN (Mr. Shand) moved—"That dividends for the half year ending the 30th of June last be, and the same are hereby declared and made out of the profits of the undertaking, at the following rates—viz., on the original shares at the rate of 10 per cent. per annum; on the capitalized stock

at the rate of 5 per cent. per annum; and on the new stock at the rate of 7½ per cent. per annum, less income-tax in each case, such dividends to be payable to the bankers of the proprietors so ordering it, and the remaining dividend warrants to be forwarded by post."

Mr. HARRIS seconded the motion, which was put and carried.

The CHAIRMAN: Gentlemen, the next motion I have to make is in relation to the call. It is—"That a call of £10 per cent. upon the new stock be, and the same is now made on the several proprietors in this undertaking, according to their registered amount of such stock, and that such call be paid into the hands of R. C. L. Bevan, Esq., 54, Lombard Street, the company's banker, on or before Nov. 1 next." In bringing this resolution before you, it will naturally be expected that I should tell you what we are going to do with the money. And I may say, at once, that the principal cause of our making this call is that the extension of our business requires an extension of our gasholder room. We have entered into contracts to build two tanks for £14,000; indeed, these tanks are built, and we are now asking for money to pay for them. We have contracted also for a gasholder, which is to cost us £12,940. These two sums together amount to something like £27,000, and the call will produce £36,000. Probably another question may be asked, viz.—"Why should you make two tanks, and only one gasholder?" The fact is that, in order to economize space on the ground, we find it better to make the two tanks together. If we had made only one now, we should have found when we came to make the second, which we should have to do hereafter, that they came so close together that it would be impossible to make the second satisfactorily. We can make the two much more easily at the same time than we could make the second after the first is filled with water. The gasholders for these tanks will be each of the capacity of 1 million cubic feet. I have been to see the tanks this week, and, as far as I am able to judge, they are as finely executed work as ever was seen. One of the gasholders is being constructed, and will be in a great measure completed before we ask you to pay any money for it, so that the company will lose nothing in the shape of interest on capital. As soon as you pay the call, the holder will be in use. I may state generally to you that in 1871 we made a call upon you of £18,000. On the same occasion we erected a tank and gasholder, and we paid on account of them £8822 before we asked you for anything. In December, 1871—the half year in which that was done—we expended £8822, in the following half year £2405, and in the next half year £13,007, making together £24,234, in extension of plant, which was £6000 more than the amount of the call upon you. I may remark also that during that period we had no working capital, except the amount of the undivided balance. In fact, in November, 1872, the money expended on capital account was £358 more than had been called up; so that we actually carried on the concern with the floating undivided balance, and had no capital for the working of the concern. Since then we have called up £10,000 worth of bonds at 5 per cent., and after we have paid off what we have contracted for, there will be a working balance of £26,500. Considering what a large concern this has grown into, you will not think that is a very extraordinary sum of money to work with. At the present time we have 20,000 tons of coal in stock. But at what cost? Instead of £15,000, as it would have been last year, it amounts to £25,000; so that of our working capital we have £10,000 additional absorbed in coals. The high price of material, as you see, makes a sufficient working capital more needful than before. I think I have shown you that in asking 10 per cent. upon the new shares we are only asking what is reasonable, and I hope that, having explained so much, some shareholder will second my proposition that the call be made.

Mr. DOWNES seconded the motion, which was put, and carried unanimously.

On the motion of Mr. DOWNES, seconded by Mr. ROYLE, a cordial vote of thanks was given to the directors and officers of the company for their continued exertions for the benefit of the company.

The CHAIRMAN, in acknowledging the vote, said: On behalf of the directors and for myself, I beg to thank you for the compliment paid us. Of course, having an interest in the prosperity of the company equally with those gentlemen who do not sit at this table, we are as desirous as they can be to see the business progress, and I assure you it is a great gratification to us when we can meet you, and give you such a return on your investment as you are fully entitled to receive, and which I hope, as long as we continue here, you will receive. We shall do our best for our interest and yours in the time to come, and trust still to enjoy your confidence and approval.

SHEFFIELD UNITED GAS COMPANY.

The Thirty-Seventh Ordinary Meeting of Shareholders was held on Friday, Oct. 17—Mr. F. T. MAPPIN in the chair.

Mr. B. WAKE read the following report of the directors:—

In submitting the accounts for the past half year, your board are glad to report that it will not be necessary, on the present occasion, to have recourse to the reserve-fund in order to pay the usual dividend; but that, on the contrary, there will, after paying such dividend, be a small balance (£388 3s. 7½d.) to go in augmentation of that fund, which will then amount to £39,725 3s. 1d.

The profits for the half year have amounted to £20,021 0s. 10½d.

The dividend will be—

Dividend on £135,000 class A stock, after the rate of 10 per cent. per annum	£6,750	0	0
Dividend on £309,053 10s. class B stock do. do. do.	10,452	13	6
Dividend on 9970 new £10 shares, £9 per share paid up (but of which £1 carries dividend only from the 1st day of April last), at 7½ per cent. per annum, being after the rate of 4s. 10½d. per share	2,430	3	9
	£19,632	17	3
Surplus	388	3	7½
	£20,021	0	10½

At the shareholders meeting, in October, 1866, the directors were authorized to exercise the borrowing powers of the company to the amount of £20,000. Such authority was acted upon to the extent of £16,200, but of that sum £6800 has been since repaid.

A resolution will be submitted to the meeting authorizing the directors to reborrow the sum so paid off, the sanction of the shareholders being requisite, and your board deeming it advisable that it should possess the power should circumstances arise rendering it advisable to exercise it.

Your company, like all other gas companies, has yet to contend with the very difficult question of the supply of coal and cannel, but it would not be in your interest that your directors should in this report enter into any details as to the position in which the company stands in that respect, and your directors think you will be content with their assurance that they have dealt, and will deal, with that question in the way which they believe will be most conducive to the welfare of the company and of the gas consumers.

The directors who now retire by rotation are Mr. Hobson, Mr. Hudson, and Mr. Henry Unwin. They are all eligible, and offer themselves for re-election.

Dr. *Capital Account, for the Half Year ending June 30, 1873.* *Cr.*

RECEIPTS.	To Dec. 31, 1872.	To June 30, 1873.	Total.
To Class A stock, fully paid up	£135,000 0 0	..	£135,000 0 0
Do. B ditto ditto	209,053 10 0	..	209,053 10 0
9970 new ordinary £10 shares, £9 per share paid up	59,320 0 0	£29,910 0 0	89,730 0 0
Amount raised on mortgage £14,400 Less paid off since 5,000	9,400 0 0	..	9,400 0 0
Calls paid in advance on new ordinary £10 shares	..	248 0 0	248 0 0
			£443,431 10 0
Balance			6,980 2 5½
			£450,411 12 5½

EXPENDITURE.	To Dec. 31, 1872.	To June 30, 1873.	Total.
By Land, buildings, parliamentary, and other expenses, works, and machinery (including mains to June 30, 1855)	£350,023 7 8	£17,046 19 11	£367,070 7 7
Mains from June 30, 1855	56,352 6 7½	2,426 14 11	58,779 1 6½
Meters	24,013 10 2	548 4 2	24,562 3 4
			£450,411 12 5½

Revenue Account.

To Half year's gas, meter, and other rents, due this day, including amount arising from the sale of coke, tar, waste lime, ammonia water, gas-fittings, and work done		£76,501	15 6½	By Half year's expenditure in the production of gas	£55,731	2 4
				Paid mortgagees and bankers for interest during the half year	749	12 4
				Balance	20,021	0 10½
		£76,501	15 6½		£76,501	15 6½
Maximum price of gas, 3s. 1d. per 1000 feet.						
				Dividends payable Nov. 1, 1873	£19,632 17 3	
				Balance to be carried to reserved fund, Nov. 1, 1873	388 3 7½	
Balance brought down		£20,021	0 10½		£20,021	0 10½

General Balance.

To Balance of revenue account		£20,021	0 10½	By Ledger balances and accounts owing to the company	£37,981	4 5½
Ledger balances, and accounts owing by the company		45,249	2 2½	Balance of capital account	6,980	2 5½
				Stores in hand	16,985	6 11
				Balance due from bankers	3,321	10 4
				Ditto cashier	1	18 11
		£65,270	3 1		£65,270	3 1
Reserved fund, invested Dec. 31, 1872					£36,295	19 11
Amount tranferred from revenue, May 1, 1873					2,249	0 11½
					£38,545	0 10½
Interest to June 30, 1873					791	18 7
					£39,336	19

The CHAIRMAN, in moving the adoption of the report, said he was sure the shareholders would agree with the directors that there was every cause for satisfaction at the result of the working for the past half year. The directors were not able to place the same amount to the reserve-fund as had been the case on former occasions, but when the balance-sheets of other companies were considered it would be felt that there was every cause for satisfaction, and that they ought to have the same confidence in this undertaking as they had hitherto had. Since he had been chairman of the company he had devoted more time and examined more minutely into the working of the business: and his opinion was that it was conducted with efficiency, energy, and good judgment. He must state also that very much of this success was owing to the manager, Mr. Roberts, and the officials engaged with him. They had been well trained, and if the Sheffield Gas Company did not maintain the same position that it had held for a long period he should be very much surprised. The directors had had considerable anxiety as to the cost of coal for some time past. The favourable contracts that were running when the shareholders last met had expired, and great caution had been necessary in entering upon others. He thought the directors had cause to be satisfied with what they had done in this respect. He was perfectly satisfied, and he thought his colleagues were also. But he would not mislead them in any way on this subject, for both he and his colleagues felt satisfied they would have to trench heavily upon the reserve-fund to meet the deficiency which would exist at the end of the present half year. It would not, he hoped, continue for any lengthened period; but their opinion was that this fund was intended to meet extraordinary contingencies, and they thought the present high price of coal was one of them. Various opinions had been expressed by the public and the press as to the continuance of it, but they hoped it would be only temporary. It might or might not be so; but so far they had great cause to be satisfied, particularly when they considered the position that other gas companies were in. No doubt some of them had seen the statements that had been made in the accounts of numerous companies not so favourably placed as themselves. He would mention one of them—though possibly some of those present had seen the statement. He referred to that large company, the Birmingham and Staffordshire Gas Company. The sum available for the dividend during the past half year was £11,878, and they had to take besides this from their reserve-fund £13,672. It would be seen at once that any company so placed must raise the price of gas to protect its shareholders. That company did so, and raised the price to 3s. 6d. per 1000 feet, less 5 per cent. Leeds, he was told, were taking powers in their bill to come before Parliament next session to raise the price of gas from 3s. 9d. to 5s. per 1000, if they find it necessary. (A Voice: "Corporation.") Manchester were charging 3s. 9d., and the committee of the Town Council had recommended a further advance of 5d. per 1000. (A Voice: "Corporation.") Dundee—which they had frequently heard of in Sheffield (laughter)—had raised its price of gas from 4s. 2d. to 6s. per 1000. (A Voice: "Corporation," and laughter.) He had returns from nearly 100 towns, all of which had raised their prices for gas, more or less. And if the result of the

working of the Sheffield Gas Company during the present half year turned out more unfavourable than the directors anticipated, the shareholders might depend that the directors would not hesitate to raise the price so as to protect their interests, and the public might also depend that the directors would not raise the price of gas more than they found to be necessary.

Mr. J. Hobson seconded the motion for the adoption of the report, which was put and carried.

The Chairman moved that a dividend be declared of 10 per cent. upon A and B stock, and 7½ per cent upon the new £10 shares.

Mr. F. E. Smith, in seconding the motion, asked the directors what they intended to do about increasing their capital. They were spending a large sum of money upon their new offices, new mains, and various other things. They seemed to have exhausted, or nearly exhausted, all their calling powers; and he saw nothing in the report about further capital. He thought it well to inquire what the intentions of the directors were in that respect.

The Chairman, in reply, said he thought if Mr. Smith referred to the report, he would see that they had power to borrow to the extent of £10,000, besides calling up the remaining £1 per share upon the £10 shares. Mr. Smith might be assured that they would call up the money when it was required, but certainly not before.

The resolution was carried.

The Chairman moved—"That the directors be and they are hereby, on behalf of the company, authorized to reborrow on mortgage or bond all or any part of the sum of £6800, part of the sum of £20,000, which, at the meeting of the company holden on the 18th of October, 1866, was authorized to be borrowed on mortgage or bond, and which sum of £6800, having been borrowed under the authority given at the said meeting, has since been repaid, and for securing the repayment of any sum or sums of money by this present order authorized to be borrowed, and the interest thereon, to mortgage the undertaking and the future calls of the shareholders, or to give bonds in manner provided in the Sheffield Gas Act, 1866, and the Acts of Parliament included therewith."

Mr. Parker seconded the motion, which was carried.

The retiring directors, Mr. Hudson, Mr. J. Hobson, and Mr. H. Unwin, were re-elected, and a vote of thanks to the chairman concluded the proceedings.

LIVERPOOL UNITED GAS COMPANY.

A Special Meeting of the Proprietors of this Company was held on the 8th inst., Mr. T. Earle in the chair, for the purpose of raising, by the creation of new shares, such further capital as was empowered by the company's Act of 1865.

The Clerk (Mr. Garnett) having read the advertisement convening the meeting,

The Chairman said the meeting was convened to consider and obtain the sanction of the shareholders to the increase of capital by the issue of new shares, which had been rendered necessary by additions made to the works, consequent upon the growth of the town and the increased consumption of gas. The works were not sufficient, and the directors were obliged to supplement them. Of the stock of the company there still remained in hand £163,525, which included the sum of £3775, equivalent to 151 shares, created at a previous issue, but never taken up, and which had remained in the hands of the company ever since. It was necessary to cancel these shares, which otherwise would be found on the books twice, and it had been thought best to convert these into 7 per cent. stock. It had been found both best and most convenient that the new stock should be in shares of £7 10s. each, whereby the difficulty of dealing with fractions would be reduced to a minimum. It had, therefore, been proposed to create 21,803½ shares, and it was intended to offer to the present proprietors three shares of £7 10s. each to every £100 of stock, and so on in proportion to the smaller holders, leaving the amount not appropriated to be considered and appropriated by the directors as they might think necessary. There would be a call of 30s. per share on the 1st of January, but it was thought that there would be no necessity for a call for some time to come. There was also a resolution for the approval of the meeting authorizing the directors to borrow an additional £60,000, which, when the increase of shares had taken place, and the call of 30s. each had been paid, the directors would be entitled to make use of under the provisions of their Act, and that would carry them on for a long time to come.

Formal resolutions for carrying out these objects were adopted.

HEREFORD (CORPORATION) GAS-WORKS.

At the Monthly Meeting of the Hereford Town Council on the 7th inst.—the Mayor (Mr. E. E. Bosley) presiding,

The following report by the Gas Management Committee was presented:—

Gentlemen,—Your committee have to report that they have made a contract with Mr. Richards, of Golynos Colliery, for a supply of coal up to the end of September, 1874.

The subject of an increase in the price of gas has engaged the attention of your committee. They consider that some increased charge will be necessary to be made for gas during the current quarter, if they are to provide the whole of the interest and instalments of principal borrowed. At the November meeting your committee will ask the council to come to some determination as to the source from which the annual instalment of principal is in future to be provided.

Your committee further report that, in accordance with the resolution passed at the adjourned meeting of the council in August last, they have obtained the services, of Mr. E. Sandell, of London, to audit the accounts, whose report and balance-sheet is annexed.

Mr. Sandell's Report.

Gentlemen,—With the view of ascertaining the financial position of your corporation gas-works, and the result of working the same for the year ending June 30, 1873, I have (in accordance with your instructions) attended at Hereford and examined the books of the undertaking, and have the honour herewith to furnish a balance-sheet, a profit and loss or working account, and the requisite subsidiary accounts in explanation thereof, and by which will be seen the following results, namely:—

That the assets, including the original cost and expenses of the works, and subsequent extensions, amount to	£57,463	19	6
And the liabilities (including the loan) for the purchase and providing for interest on the same amount to	56,764	11	2
Leaves (subject as hereafter stated) for repayment of loan	£699	8	4
This result is proved by the profit and loss, or working account, which after showing the income derived from the sale of gas, residual products, and profit on fittings, amounting in the aggregate to	9,428	1	10
And deducting the expenditure to obtain such result, namely	6,250	2	6
Shows a balance of profit of	£3,177	19	4
And deducting from which the interest on loans	2,478	11	0
Leaves as above stated	£699	8	4

This profit, I apprehend, cannot be entirely appropriated to the repayment of the loan, for the reason that during the year there has been expended on extensions of works, mains, and services, minus old materials sold, the sum of £145 16s. 2d. If, therefore, the amount of £145 16s. 2d. be deducted from the surplus profit of £699 8s. 4d., there will be left the sum of £553 12s. 2d. towards the repayment of the loan; and this sum, although not arrived at in a similar manner to that adopted by your manager, is very approximate to the amount he has named in his report, namely, £536 4s., but an amount in excess of £27 7s. 3d.

It is scarcely necessary to say that this difference might not have arisen had your manager not followed the method of book-keeping previously adopted by the late company; and for the more perfect conduction of your books of accounts I have made some suggestions to him which doubtless, with your sanction, he will adopt. It is, however, but justice to the manager, the collector, and the clerk that I should say that although the system adopted (in my opinion) is capable of improvement, yet in recording the details of the transactions of the undertaking they have all been very exact and correct, and it is also satisfactory to see that out of an annual rental of private consumers, amounting to upwards of £6000, the arrears on the 30th of June only amounted to about £100, and that the deductions and allowances during the year did not amount to 50s.

With the exception of the coals, it would scarcely be fair to make a comparison with the expenditure of the late company, because three years expenses on account of general repairs is usually the data for an annual average; but with regard to the cost of coals, in conjunction with the rental, it bears a very favourable comparison.

The annual average cost of the coals of the last three years of the late company was £2280, and the rental £6514, the cost being a little over one-third of the income, whilst for the last year the coals cost £4342, and the rental was £8017, the last being nearly one-half of the income, although the increased charge per 1000 cubic feet during the past year has not been one-seventh over the late company, thus showing a favourable comparison over the previous three years make.

(Signed) Edward Sandell.

4, Skinner's Place, Size Lane, London, Sept. 30, 1873.

Mr. Garrold, moved the adoption of the report, and in doing so congratulated the council upon the successful result of the first year's working of their gas-works. The only clause in the report to which he wished to call their attention was that relating to the payment by instalments of the principal in the future. He did not want to have any argument as to what was the proper method of raising the money, because, as the report intimated, the committee would send up another report in November, and in that report the question would be raised. There were three methods which the members of that body and the public generally were considering. Some people said they ought to raise sufficient in the shape of profits upon the gas to pay off the interest and instalments of the principal; others said that as the gas-works, when they had been paid for, would become the property of the city generally, the money should be raised by rates upon the whole city. That might be right or it might be wrong; but the third suggestion was that all excess of money in their funds should go to pay the interest and the principal. It was absolutely necessary that the Gas Committee should know what they had to do. If the council determined to raise the instalments of principal by a rate, the Gas Committee would not have to raise the money; if they raised it by borrowing the excess from their funds, then the Gas Committee would not have to raise it; but if they came to the conclusion that the Gas Committee should raise the money, the committee would then have to raise the price of gas. From the report of Mr. Sandell it would be seen that the balance of actual profit was £699 8s. 4d. There was also a sum of £145 16s. 2d., as stated in the report, which had been expended in various works, and it became a question as to whether they should take it from their funds or ask the corporation to provide them with it. Some principle was involved in the manner of the raising of the principal. If they were to raise it on the profit, they ought to be told so. They proposed to ask for the payment of the £145 16s. 2d.; and in paying the instalments of the principal they asked that one sum of £202 2s. 5d. should be paid by the corporation. The total profit, £699 8s. 4d., would be employed in the erection of works, leaving the sum of £145 odd as the actual profit made during the year, and applied to the extension of works, &c., to be paid as the council might decide. They asked them for a cheque for £202 2s. 5d., but if the extension of the works was to be provided for out of the profits of the undertaking, they would ask for payment of the other sum of £145 16s. 2d. He moved—"That the report and accounts now produced be received and adopted, and that the sum of £202 2s. 5d., being the difference between the amount of net profit (£699 8s. 4d.) and the instalment of principal due on the 30th of June (£901 10s. 9d.), be paid over to the Gas Management Committee."

Mr. Llanwarne, pointing out that, under the terms of the loan, the instalment in repayment of the principal increased with every year, suggested that a fixed proportion only of this—say £900 or £1000 a year—might be taken out of the rates, the Gas Management Committee providing the remainder out of the profits of the concern.

Mr. Garrold hoped no discussion would be entered upon just now. His only motive in introducing the matter at all at this meeting was to let the council know that the question of where the £55,000 to be paid for the gas-works was to come from—whether it was to be provided from the profits of the concern itself, from the rates, or from the surplus profits of the other public works in the hands of the corporation—would have to be asked at the next meeting. So far, however, as the £202 was concerned, that must come out of the funds of the corporation, and therefore there could be no possible objection to the payment of that being ordered at once.

The motion was carried unanimously.

GLASGOW (CORPORATION) GAS SUPPLY.

The Ordinary Monthly Meeting of the Glasgow Town Council was held on the 9th inst.—the Lord Provost in the chair.

Mr. Martin, pursuant to notice, moved the following resolution:—"That a return be furnished to this board of the losses the Gas Committee has sustained through non-payment by the upper and middle classes of their gas accounts from the 1st of July, 1870, to the 30th of June, 1873; also, that a return of the losses sustained by the said committee through non-payment on the part of the working classes, or those who have to give deposits of money in security of their gas accounts, from the 1st of July, 1870, to the 30th of June, 1873; and that an account be rendered to this board of the interest and compound interest accumulated on said deposits for the last three years from the 1st of July, 1870; also, the amount of money the Gas Committee has received from builders and others for the last three years, dating from the 1st of July, 1870, for supplying and fitting in gas-pipes in connexion with their properties, which were supplied by the old gas companies free of charge."

Mr. John Brown seconded the motion.

Mr. W. Miller moved the previous question. He did so, he said, because the motion was invidious. It set what Mr. Martin called the upper and middle classes against the lower class; and he did not think the council should countenance such a proceeding. In the second place, it was totally impossible to make such a return as was proposed. He might state, however, for the information of the council, that the loss arising from bad debts during the period indicated was about 12s. in the £100, and of that 12s. two-thirds, or 8s., was on accounts under £1. He was not entitled to say that all these accounts were accounts of those from whom deposits were taken, but he was prepared to say that the great proportion of them were. He believed there were far greater reasons for increasing the rate and extending the area of the deposits than for abolishing them; for, had there been no deposits, the loss would have been many thousands a year. With respect to the sum charged to the builders, it amounted to £3000 a year; but he held that it was equally just that it should be charged on the property as on the gas-pipes laid through their houses. It was just as reasonable that the proprietors should pay for the one as for the other; and if it was not paid by the proprietors, it would be charged against the ratepayers. Mr. Martin had made a great outcry about the interest accruing from the deposit of the working man. He believed Mr. Martin made more about it than the working man himself. The interest only amounted to 3d. a year, and every one of these consumers of £1 or 10s. a year was supplied with a meter, and the interest on the cost of that meter was a vast deal more than the interest on the deposits.

Mr. Torrens seconded the amendment.

On a division, 25 members voted for the amendment, only the mover and seconder voting for the motion. The amendment was therefore carried.

Birmingham Water Supply.—Dr. Hill, the medical officer of health for Birmingham, reports for September that the water supplied to that town, though rather turbid, had improved since the previous month; the proportion of nitrogen in all forms, however, continued high.

MANCHESTER (CORPORATION) GAS-WORKS.

An Adjourned Meeting of the Manchester City Council was held on the 3rd inst.—the MAYOR presiding—at which the report of the Gas Committee for the year ending Midsummer last was received for entry on the minutes. The report, which, with the accounts, we shall probably find room for in our next, concludes with a recommendation that the price of gas shall be increased 5d. per 1000 cubic feet from Michaelmas-day.

Alderman KING, chairman of the Gas Committee, in moving the adoption of this recommendation, reminded the council of the engagement entered into with them that the Gas Committee should equalize their payments to the Improvement Committee, and make over payments to them, even when their profits were not over 10 per cent., in anticipation of the profits of the future. In 1868, under that arrangement, £13,000 was paid over to the Gas Committee, while their profits were under 10 per cent.; in 1869 they only had to pay £11,000, and in 1870 the position of the Gas Committee still further improved, and they had only to pay £3750. In 1871 they gained their 10 per cent., and had £6000 of a surplus with which to help to wipe off the balance of these payments to the suspense account, bringing that balance down to £22,000 instead of £28,000. At this time a great change occurred; wages rose, the price of coals increased, and by reason of these and other adverse circumstances, instead of having some £13,000 to wipe off their adverse balance, they found themselves in the next year with £13,000 of a deficit. They estimated that they would have a similar deficit for the year 1872-3, and estimated a further loss of at least £20,000 in the increased price of coals and labour. To cover this they estimated that they would get something extra for coke, estimated at £10,000, by an advanced price of 2d. per 1000 feet then charged £11,000, and from extra profits £2500, making £23,500. This sum, deducted from the estimated loss, gave the deficit at £9500, a reduction on that of the former year. The actual results, however, had not borne out the estimate. The increase in the price of coals and wages amounted to £34,000, and the increase in the receipts was not correspondent with that in the expenditure; from their advanced prices, their coke and other residuals, and the profit on the increased make of gas, only yielded £32,500, leaving a deficit of £14,500. The suspense account now ran against them to the amount of something like £52,000; and it was a serious question whether such a state of things ought to be allowed to continue. They ought, at least, to take care that the balance was not increased, and in his opinion they should have some little margin in their accounts to help to wipe it off. What were their prospects? The deficiency of this year amounted to about £13,500. The extra cost of coals, now their long-standing contracts were gradually dropping off, would be very great, and was estimated this year at £23,000, the total being £36,500. If it was agreed to pay £6000 towards the suspense account the total would be £42,000. But neither total could well be met without the increase proposed in the price of gas. An increase of 5d., as proposed, would yield £27,700, and the estimated profit on increased consumption was £2500. This left a deficit of either £6000 or £12,000, according to the arrangement made as to the suspense account, with only what they might receive for their coke to cover it. They never knew what to calculate for increase of consumption, and that he had not estimated. He did not think the Gas Committee was suggesting a larger increase than it was fair the ratepayers should pay. They had previously given the ratepayers more than they ought, in strict observance of the principle that the gas department ought to yield 10 per cent., and on a comparison with other large towns it would be found that the price was not too high. In Liverpool, which was similarly situated for supplies, and was a town of similar area, the ratepayers paid to a commercial company the same rate which, after the adoption of his resolution, the Manchester ratepayers would be charged. The principle of the Manchester Corporation had always been that the ratepayers were entitled to have their charges as low as they could be made by a commercial company, and they were not transgressing their principle in this instance. He hoped the council would adopt his motion.

Mr. GOLDSCHMIDT seconded the motion, and Mr. HOPKINSON supported it, remarking that Alderman King had saved the ratepayers thousands and tens of thousands by his foresight in making the long-standing coal contracts. One gentleman, whose firm was under a contract to the corporation that was still running, had informed him that upon that contract alone £70,000 had been saved to the corporation.

Alderman CURTIS, a member of the Gas Committee, proposed as an amendment that the increase should be only 2d. per 1000. He said that Mr. Peacock had estimated that the increase in the receipts from the sale of coke, &c., would amount for the year to £11,250, and the increase of 2d. per 1000 for gas would bring in £12,000; which would make the increased receipts about £25,000; and that, he contended, would enable the committee to meet the deficiency.

Mr. W. G. BENNETT seconded the amendment.

Mr. NIELD moved the adjournment of the council. He said a difference with regard to the actual figures existed amongst the members of the committee themselves, and he thought it would be best to allow the committee to come to a unanimous conclusion as to what should be done.

Mr. MUIRHEAD seconded the motion for adjournment, which, after a short discussion, was carried.

CARLISLE (CORPORATION) GAS AND WATER-WORKS.

The Ordinary Meeting of the Carlisle Town Council was held on the 14th inst.—the MAYOR presiding.

Mr. HARGREAVES, pursuant to notice, submitted a resolution to the effect that the corporation cease to trade in gas-fittings as soon as their present stock is disposed of.

At the suggestion of Mr. J. Graham, a report was read which had been presented to the Gas Committee by Mr. Hepworth, the manager of the gas-works. This report stated the trade in gas-fittings had been conducted by the corporation from the time when the works were purchased in 1850. The business done last year was about £1700, the net profit being £159, equal to 7½ per cent., without including fitting work done at the gas-works, which would increase the amount by at least £50. Mr. Hepworth suggested that the reason for gas companies undertaking the business of gas-fitting in the first instance was, doubtless, that tradesmen had not at that time the requisite knowledge, or were unwilling to embark in a new business. A few corporations had relinquished the business; and most of those who continued it had done so, he believed, not only on the ground of profit, but because their special knowledge enabled them better to advise and carry out the requirements of the gas consumers. The Gas Committee had invariably declined to contract for the supply and fixing of gas-fittings. Contract work had, therefore, remained solely in the hands of the tradesmen of the town, who also had been quite free to enter the general gas-fitting business, the gas consumers being as free to employ them as the Gas Committee. In the event of the Gas Committee relinquishing the trade, he recommended (1) that the stock should be gradually disposed of so as to prevent as much loss as may be; (2) the staff should be rearranged; (3) some regulations should, he thought, be put in force by which gas-fitters should be bound in the interests of the corporation and the gas consumers.

Mr. HARGREAVES said that Mr. Hepworth had received ten replies to his inquiries as to the practice in other towns; of these only two carried on the business of gas-fitting, and eight did not, but two out of the eight thought it would be an advantage if they did. He did not, however, set much store by these figures. His objection to the council selling gas-fittings was that they should not carry on a business which any of the ratepayers in the ordinary course of business could do. It was an improper thing for the council to enter into competition with its constituents. But he had not only the objection that it was unfair to the tradesmen, but that it was done at a loss. His examination of the accounts as auditor had given him opportunities of examining them perhaps closer than Mr. Hepworth, and he asserted that their business was conducted at a loss. This he proceeded to show as follows:—

Value of stock on June 30, 1872	£1,943 10 2
Purchases up to June 30, 1873	2,583 11 11
	£4,527 11 1
Subtract value of stock on June 30, 1872	1,959 10 0
Leaves	2,568 0 7
As the net cost of the fittings disposed of during the year. To this he added 5 per cent. interest on capital	95 0 0
And for working expenses, such as rent of show-room, salesman's time, book-keeper, collector, and credit, 2½ per cent.	65 0 0
Making	£2,728 0 7
As the total cost of the year's sales. From this he subtracted the net credits of the year—viz.	2,563 14 4
Leaving an absolute loss on the year of	£164 6 3

He further stated that the committee's competition with private tradesmen was not confined to Carlisle, but that they went so far as Maryport, Silloth, &c. He strongly deprecated the competition under any circumstances, but if we must do such work let a fair profit be charged. At one time it had appeared to him desirable that the Gas Committee should go no further than the meter; but, in the first place, he would content himself with moving that they discontinue trading.

Mr. TODD seconded the motion, the further consideration of which was, after a brief conversation, adjourned until the next meeting of the council.

The following statements of account for the year ending June 30, 1873, were presented at the meeting of the council on the 9th ult.:—

G A S.

Abstract of the Treasurer's Account.

Dr.			*Cr.*		
Balance in bank, June 30, 1872		£2,536 16 6	Wages, materials, fittings, interest, &c.		£23,421 14 8
Gas, coke, &c.		21,008 8 3	Balance in bank		123 10 1
		£23,545 4 9			£23,545 4 9

Capital Account.

Total expended on permanent works to June 30, 1872	£33,074 8 0		Balance, being net value of works at this date		£34,922 0 4
Less one year's depreciation, 3 per cent.	992 4 8				
		£32,082 3 4			
Expended in extensions during the year—					
Lamps and fittings	£28 13 8				
Mains	236 19 3				
Services	33 16 9				
Retort-bench	402 10 6				
Apparatus, including balance of new gasholder	2,137 16 10				
		2,839 17 0			
		£34,922 0 4			£34,922 0 4

LIABILITIES.			ASSETS.		
Loans on mortgage		£11,505 0 0	Capital account		£34,922 0 4
Deposits		984 8 1	Stock of materials, tools, &c.	£4,000 5 3	
Sundry creditors		804 6 0	Ditto coal	1,535 10 0	
Balance, being excess of assets over liabilities		43,364 18 5			5,535 15 3
			Reserve-fund, invested as follows:—		
			Lowry Holme Estate Mortgage, at 4 per cent.	£1,800 0 0	
			Water-Works Bonds, at 4 per cent.	408 10 0	
			Water-Works Loans, at 4 per cent.	3,200 0 0	
			Maryport and Carlisle Railway Stock, at 4 per cent.	2,000 0 0	
					7,463 10 0
			Arrears	£103 12 1	
			Gas accounts, June 30, 1873	6,483 10 1	
			Meters, fittings, and meter-rents, June 30, 1873	879 0 10	
			Coke and sundries	1,142 13 10	
					8,608 16 10
			Cash in treasurer's hands		123 10 1
		£56,658 12 6			£56,658 12 6

Profit and Loss.

Stock account, June 30, 1872	£4,029 9 8		Gas sold in year		£14,200 4 6
Ditto of coal, June 30, 1872	252 15 0		Coke		4,199 1 9
		£4,282 4 8	Tar and ammoniacal liquor		971 15 9
Cannel, coal, and cartage		12,542 19 9	Meters, fittings, castings, old metal, &c.		3,092 13 4
Purifying material		92 1 10	Interest from bank		12 17 3
Salaries—			Ditto reserve-fund		211 2 0
Manager	£200 0 0		Stock account, June 30, 1873	£4,000 5 3	
Accountant, clerks, and collectors	843 1 2		Ditto of coal, June 30, 1873	1,535 10 0	
Auditors	44 2 0				5,535 15 3
Wages	3,091 17 5				
		3,679 0 7			
Meters, fittings, and castings		2,563 11 11			
Retorts and fire goods		250 15 1			
Repairs of streets		13 16 8			
Rents, rates, and taxes		391 2 0			
Printing, stationery, postage, &c.		96 4 4			
Tradesmen's accounts		612 8 6			
Incidentals, subscriptions, &c.		64 15 7			
Bad debts		48 13 7			
Interest on deposits		25 8 6			
Ditto mortgage bonds		467 16 10			
Balance, being profit for the year		3,072 9 10			
		£28,223 9 10			£28,223 9 0

Appropriation of Profits.

Corporation (ann. payment).	£200	0	0	Gross profits	£3,072	9	10
Amount refunded on extensions	2,839	17	0				
Balance	32	12	10				
	£3,072	9	10		£3,072	9	10

WATER.

Dr. *Abstract of the Treasurer's Account.* *Cr.*

Balance in bank, June 30, 1872	£474	19	2	Wages, materials, interest, &c.	£3,972	12	5
Water, &c.	4,820	14	11	Balance in bank	1,323	1	8
	£5,295	14	1		£5,295	14	1

Capital Account.

Total expenditure on works to June 30, '72	£44,059	5	7	Balance, being net cost of works to this date, less annual deduction for depreciation	£43,472	8	3
Less one year's depreciation at 2 per cent.	881	3	8				
	£43,178	1	11				
Extensions during the year—							
Mains . . .	£244	6	4				
Service-pipes .	50	0	0				
	294	6	4				
	£43,472	8	3		£43,472	8	3

LIABILITIES.				ASSETS.					
Loans on mortgage . .	£37,696	0	0	Capital account . . .	£43,472	8	3		
Ditto from gas-works . .	3,200	0	0	Stock ditto	439	15	3		
Sundry creditors	193	11	9	Sinking-fund	65	18	3		
Balance, being excess of assets over liabilities	4,579	2	10	Cash in treasurer's hands .	1,323	1	8		
				Arrears . . .	£44	10	2		
				Water accounts due June 30, 1873 . . .	299	15	1		
				Sundries . .	23	5	11		
								367	11	2
	£45,668	14	7					£45,668	14	7

Profit and Loss.

Stock account, June 30, 1872	£436	4	0	Water sold in year . . .	£4,802	14	0
Coal and cartage	447	18	11	Pipes, castings, sluices, &c. .	287	3	10
Salaries—				Interest from bank . . .	28	4	2
Manager . . £50 0 0				Stock account, June 30, 1873	439	15	3
Accountant, clerks, and collectors . . 50 0 0							
Auditors . . 18 18 0							
Wages . . . 435 19 8							
	554	17	8				
Pipes, castings, service-pipes, &c.	263	16	9				
Rents, rates, and taxes . .	176	12	11				
Printing, stationery, and postage	12	12	2				
Incidentals	6	5	5				
Bad debts	8	2	0				
Tradesmen's accounts . .	96	0	4				
Repairs of engines	37	9	2				
Ditto streets	22	2	8				
Interest on mortgages . .	1,771	4	5				
Balance, being profit for the year	1,724	10	10				
	£5,557	17	3		£5,557	17	3

LIMERICK (CORPORATION) GAS-WORKS.

At the Meeting of the Limerick Town Council on the 2nd inst.—the MAYOR presiding,

Mr. SPILLANE, pursuant to notice, moved the following resolution:—"That in the event of the United General Gas Company being prepared to sell their works to a citizen joint-stock company, this council will be prepared to sell their works to the said citizen company." He referred to the proposed purchase of the works in their cities by the Corporations of Dublin, Cork, and Belfast; and said that if those corporations had had 18 years such experience of the management of gas-works as the Limerick Corporation had, they would not be in so great a hurry to undertake the management of the gas-works in their cities. In his opinion manufacturing business of any sort was not the legitimate business of the corporation. The only reasons that could justify them as a corporation to undertake any manufacturing process were either of two things—an absolute necessity for the putting down of a monopoly, if it prevailed, and the corporation were bound to prevent any monopoly that was prejudicial to the people. If monopoly, then, did not exist, the other reason was that the speculation would be sure to make money for them. He held that in the case of Limerick neither of those conditions existed or could be imagined to exist. It was a painful subject, but there was no going behind the fact that the corporation gas-works, as a financial speculation, had not been a success. He did not mean to impeach the conduct of the concern by the committee. He believed they had done all that could be expected of them, but with great confidence, yet with regret, he had to say that under successive managers and chairmen—and he was one of them himself—the works had never been a success, and never would be a success, and when he said that he meant they never would do what the corporation expected, that they would not only clear themselves of all debts ever contracted, but that in point of fact they would reduce the rates so low in proportion as to rival Waterford, where he believed they had nothing at all to pay. The last balance-sheet made out would fully prove to any clear-thinking man that the works were not a success. At that moment the rates were pledged to the extent of £33,000. That was more than they were worth in the market at present; and he held that any concern which had been tried with different systems that failed, and each time they found themselves involved deeper in debt, the sooner the institution was got rid of under that management the better. He did not believe any one would be so foolhardy as to contend they were a success. The question was, were they necessary, or was it necessary to carry them on further to prevent a monopoly? He contended that it was not; but if placed under a board of management of his fellow-citizens, as directors of a private company, who would care and watch and mind them just as they would their own private affairs, and whose interest it would be to do so, then he maintained they would be a success. If they could get such a company and directory—and he submitted they could be got—and by Act of Parliament bind them down to supply a certain quality of gas at a fixed rate, and the dividend allowed to be fixed, they had done their duty to the ratepayers, and that was all that was required of them, for they were bound, when they could not make money by the works, to get rid of them to the best advantage. They should not be influenced by what had been done in Dublin, Cork, or Belfast, but open their own eyes, when they could say that they had tried the works for 18 years and did not make them succeed. It was a painful subject, and it was painful to have to say that, but the truth should be told. He had spent hours, days, and weeks at the gas-works, and was acquainted with their working. He saw a gentleman present (Alderman Tinsley) who had been a most energetic and active chairman of the Gas Committee, but who failed to make them pay. He was succeeded by another merchant, who was remarkable for his zeal, activity, and ability, yet he could not make them succeed. He (Mr. Spillane) had succeeded that gentleman as chairman of the committee, but he had to admit that he did not, nor could he, see his way to making the works become a financial success. Therefore, when it was impossible to make them a success, he felt bound, having the facts and figures before them proving that under their own management the works were financially a failure, whether they were prepared to sell them to a company, bound down by the restrictions he mentioned to give a better and cheaper gas than they were at present getting, at their fair marketable value. It was with that view he moved the resolution.

Mr. MYLES: How do you make out that the rates are liable for £33,000?

Mr. SPILLANE said that on the balance-sheet it appeared that the capital amount was £17,331 1s. 9d.; amount due to the National Bank, £6697 11s. 6d; other liabilities, £9073 11s. 11d.; total, £33,102 12s. 2d.

Mr. HOSFORD seconded the resolution. He had gone into the last report issued and previous reports, and he felt rather surprised to hear a member of the Gas Committee, and who had been 20 years in the council, almost questioning the statement of the chairman of the committee by asking him how they were liable for £33,000, for it was plain to see the committee were in debt for the amount invested. They started in 1856 with a capital of £10,000 never repaid, and they received from the rates £1167 16s. In the following year they got £1748; in 1858, £884; in 1859, £300; in 1860, £430; and they borrowed £1000 from the National Bank. In 1861 they received nothing out of the rates, but they borrowed £1000 from the bank, and £279 from other parties. In 1862 they got £180 9s. from the rates, and borrowed £1000 from the bank. In 1863 they received £1308 from the rates, and in 1864, £49 2s. 7d., and in 1865, £114 19s. 3d., and £5143 2s. 3d. borrowed from the National Bank; swelling up their liabilities in that year to £23,787 10s. 9d. In 1866 they received, £505 14s. 6d. from the rates, and borrowed from bank £4609; in 1867, from rates, £40 19s. 6d., and £5090 16s. from bank; and in 1868, £601 5s. 11d. from the rates, and borrowed £4903 15s. 11d. from the bank. In the subsequent years they received nothing from the rates, but their expenditure increased yearly, for they continued to borrow from the bank, and in 1869 they borrowed from the bank £5125 7s. 4d. and £5411 5s. 5d. from other parties; in 1870 £5246 17s. 8d. from the bank, £5916 16s. 8d. from other sources; in 1871, from the bank £5929 18s. 3d., and £7200 3s. 6d. from other sources; and last year, £6697 11s. 6d. from the bank, and £9073 18s. 11d. from other parties; thus running their debt up to £33,102 12s. 2d., which showed that their expenditure was annually increasing beyond their income.

Alderman QUINLIVAN said they had heard enough of that before. Who would be got to take shares in the new company after the public read these figures?

Mr. HOSFORD replied that the ratepayers outside had discussed the matter very fully, and what would they say now, if he were prevented from making his statement, but that the council wanted to cushion the facts and conceal all information from them?

Mr. MYLES moved, as an amendment, that the consideration of the question be deferred to a future day. The project of starting a gas company had been tried before, and it failed, and would fail again. The argument of Mr. Spillane that the gas-works were not a success—that they were not a paying speculation, because no profit was derived from them—was no argument, for the works were not purchased as a money-making speculation. The corporation did not go in for a dividend; what they desired was to provide cheap gas for the citizens, which, he contended, they gave them. He advised the working of the concern by the corporation, believing that it would ultimately be a success.

Mr. BARRY, in seconding the amendment, said he disagreed with Mr. Spillane in his estimate of the works, as he considered that at whatever time hereafter they might be saleable in the market, this was not the proper time to do so. Fuel had considerably risen in price, wages had also advanced, and the discussion that had taken place, and the statements made use of by the previous speakers, must have a most detrimental effect regarding the value of the works, so much so that no purchaser would be inclined to give for them anything near their value. He was fully convinced that the plant and machinery, as they at present stood, were full value for the £33,000 which they owed.

Mr. M'MAHON CREGAN said: As a member of the Gas Committee, I have honestly to endorse every word that has fallen from Mr. Spillane. For the short time that I have been a member I have watched the proceedings of the Gas Committee, and I am positive, from the manner in which the business is conducted, that it would be much better managed by a company of owners who would have a direct interest in the concern, and therefore would bestow more attention to the working of it than individual members of the corporation are in the habit of doing. It is not in human nature to pay close attention wherever "everybody's business is nobody's business"—that men should devote so much of their time, to the detriment of their own various interests, to public matters. He was surprised that Mr. Myles, who certainly devoted much time to the subject, should not have replied more fully and logically to the arguments of Mr. Spillane and Mr. Hosford. I would be the last man in the corporation to propose the sale of the gas-works, if I believed that Mr. Spillane's proposition did not embody protection to the gas consumers; but Mr. Myles has avoided that part of his argument. Mr. Spillane's idea is, and I am of the opinion with him, that a monopoly by one gas company can just as well be avoided by having a number of gentlemen managing another concern who would be bound down in their agreement, on purchasing the works, never to raise the price of gas above the present rate; and they could still further be bound down, should any extraordinary circumstance arise by which gas could be made cheaper, to allow the citizens to participate in the profits of the new concern. It would, in fact, be a citizen company, competing with the United General Gas Company, and, therefore, ensuring a healthy competition in the manufacture of gas. For myself, I have become so thoroughly convinced of the inadequacy of my own services—for one man can do but little in any affair of the kind—that I have determined at the expiration of this year to resign my seat at the board of management, for as an honourable man I could no longer assume responsibilities which no efforts of mine could avert, owing to the great pressure of debt with which the establishment is burdened. Gentlemen must be aware that this £33,000 spoken of by Mr. Spillane and Mr. Hosford is an incubus of debt round the corporation's neck, which they must ultimately satisfy. In fact, the present debt is about 1s. in the pound on the taxation of the city. I am glad to hear Mr. Barry say that he thought the present works and plant are worth the entire amount of the debt. I will say nothing on that head, as I do not wish to depreciate our own property, but I sincerely trust that the sequel will prove that he is right in his assertion. At present the working of the gas-works is in the hands of a few gentlemen who are anxious to continue it as a system of patronage in their hands, and that is a state of things which I for one do not consider desirable should be continued.

The amendment was then put and negatived, the mover and seconder only voting for it. The motion was put and carried.

SYMES'S PATENT ECONOMIC GAS COMPANY, LIMITED.—Mr. Hedley and Mr. Whiffin, the liquidators of this company, have declared a second dividend to creditors of 3s. in the pound.

GLASGOW WATER SUPPLY.—The water supplied to Glasgow from Loch Katrine during the month of September is reported by Professor Bischof to be quite free from any evidence of previous sewage or animal contamination. When seen through a stratum one mètre thick it was slightly turbid, owing to repairs to the mains.

LINCOLN (CORPORATION) WATER SUPPLY.

Mr. H. Teague, the engineer and manager of the Lincoln Water-Works, has just presented the following report:—

To the Water-Works Committee.

Gentlemen,—During the two years, ending the 29th of September last, the water-works have been in the hands of the corporation, there has been laid down the following pipes, viz.:—

Diameters .	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	
Yards .	182	1440	1857	966	256	706	= 5407
Taken up .	169	548	280	20	—	—	= 1017
Total length in yards							4390

or about 2½ miles additional mains.

There has been laid on in the same time 402 houses, 42 water-closets, 15 baths, and 40 miscellaneous; making the totals now supplied 5147 houses, 473 water-closets; 113 baths, and 393 miscellaneous.

The quantity of water supplied in the past year was 151,329,200 gallons, being an increase of 6½ millions of gallons more than was supplied during the last year the concern was in the hands of the company. The average quantity is—Domestic 8·7, trade 5·5; total, 14·2 gallons per head per day, for a population of 29,234 persons.

Owing to the price of coals, which are 118 per cent. dearer than they were in the last year of the company's existence, a great increase under this head of expenditure will be anticipated as a matter of course; but by the application of economic principles the consumption has been less by 223 tons 18 cwt. than in 1871, making the increase only 49 per cent., or £243 3s. 5d. more than in that year. I see but little chance of extending this economy until the works are improved as provided by the Act of 1871, the necessity for which becomes more apparent every day.

The income for the past year is £4922 5s. 5d., being an increase of £432 9s. 3d. more than was earned in the last year of the company; if to this is added the loss of £153 12s., by giving up the charge made on the one water-closet, it will show an increase of £586 1s. 3d.

The expenditure, with the increased price of coals and labour, is only 36·7 per cent. of the receipts—a state of things which will bear a favourable comparison with any other similar concern in the kingdom.

That an abundant and constant supply may be maintained, the public are earnestly requested to give notice at the office of all taps that require leathering, when such repair will be done free of charge. The neglect of this renders the party liable to a penalty not exceeding £5, in addition to the cost of the repair and charge for the water wasted. They are also requested to give every facility to the men when making their periodical inspection for the prevention of waste.

(Signed) Hy. Teague, Engineer.

Lincoln Water-Works Office, Oct. 6, 1873.

HEALTH OF THE LABOURERS IN THE COPENHAGEN GAS-WOKKS.

Dr. Petersen, communal physician in Copenhagen, has published in the *Hygieiniske Meddelelser og Betragtninger* (vol. vii., part ii., 1872) the results of an investigation made by him of the diseases affecting the men employed in the gas manufactory of that city. The inquiry was undertaken in consequence of the striking increase in the demands on the sick-fund of the manufactory; and, on examining the records for twelve years, Dr. Petersen found that there had been a marked increase not only in the number of cases, but also in the average annual number of days of illness for each patient—the latter being, in 1870, as high as 18.

Of 348 cases under treatment from Nov., 1870, to Nov., 1871, 66 were surgical injuries; 266 belonged to four categories—viz., chronic or sub-acute affections of the respiratory organs, 96 (simple catarrh, 62; diseases of deeper seat, 34); acute or chronic catarrh of the digestive organs, 50; a state of general debility with fever, 28; rheumatic affections, 26.

In investigating the conditions which gave rise to these disorders, Dr. Petersen classifies the cases into those occurring among men employed in the retort-houses, and subjected to extreme variations of temperature, and those occupied in other departments. About three-fifths of the men in the winter, and one-third in the summer, are employed in the retort-houses. Among these the number of cases of disease during the period above mentioned were—simple catarrh, in winter 33, in summer 7; deeper seated respiratory disorders, in winter 18, in summer 4; gastro-intestinal catarrh, in winter 12, in summer 15; debility, with fever, in winter 12, in summer 9; rheumatism, in winter 8, in summer 3. Altogether, of 348 cases, 200 occurred in the men employed in the retort-houses.

The deeply seated respiratory affections that occur among the gas-workers are generally the result of prolonged catarrh, and consist for the most part of bronchorrhœa and bronchial dilatation, with infiltration into the lungs, producing the symptoms of "phthisis pituitosa." The general symptoms often indicate a greater amount of disease than is revealed by the physical signs. Dr. Petersen regards as important the fact, that deeply seated affections of the respiratory organs occur in 11 per cent. of a class of men originally of good constitution.

Although the men employed in the retort-houses are subject to great variations of temperature, Dr. Petersen does not regard this as sufficient to account for the frequency of catarrh. He considers that there must be some constant source of irritation of the air-passages. At first one would suppose this to be the sulphurous and other gases given off in the manufacture; but the retort-houses are so well ventilated that the presence of these is scarcely perceptible, and in the purifying-houses, where the atmosphere is nearly intolerable, bronchitis is all but unknown. It has, too, been long the custom in Denmark and other countries to expose children suffering from hooping-cough to the air of the purifying-houses, on account of its supposed therapeutic influence.

The coal-dust, in Dr. Petersen's estimation, is a much more important agent in the production of respiratory affections than the gases. He agrees with the observations made in Germany, which have shown that coal-dust acts as an irritant on the mucous membranes, and that it enters the air passages and is deposited there; but he regards its power to produce disease as much less than has been supposed by Crocq and others, who have attributed catarrh, cachexia, and a form of phthisis, to it. Hirt has shown that vegetable dusts are much less deleterious than mineral (as those of hard metals and flint); that ordinary coal-dust is among the least irritating; and that the round or polygonal particles of coal are less irritating and penetrate the mucous membranes less than the angular particles of charcoal. In confirmation of this, Dr. Petersen has constantly observed the sputa to become nearly free from coal-dust after an absence of twelve hours from the retort-house; and, in the necropsies performed at the Communal Hospital, pulmonary anthracosis has not been met with. Coal-dust may then be regarded as playing an important part in the production of simple catarrh, but not (at least directly) of the more advanced forms of disease of the respiratory organs.

The occurrence of the more severe forms of pulmonary disease among a class of men originally robust can only be accounted for by protracted catarrh, complicated with a state of debility against which their poverty prevents them from contending. These diseases, phthisical in their general symptoms, are usually of long duration, gradually rendering the men affected with them unfit for work. Death from this cause rarely occurs among those actually employed in the gas-works.

The cases of catarrhal disorder of the alimentary canal were partly acute, occurring mostly in the summer in the form of vomiting and diarrhœa, and partly chronic, generally in the form of obstinate gastric catarrh. With regard to the causation of these affections, Dr. Petersen does not think that the coal-dust has much, if any, influence. They are rather to be referred to the general conditions of the labour. The work is carried on in a high temperature, attended with violent draughts of air, which necessarily causes an excessive evaporation of water from the surface of the body, the result of which is great thirst and loss of appetite. Under these unfavourable circumstances as regards digestion, the labourer might keep up his nutrition, if he could be supplied with well-selected and well-prepared food. This, however, cannot at present be done, and to stimulate his powers he almost inevitably has recourse to that which is most accessible, and which has most effect in rousing his depressed vitality—brandy, which, with large quantities of oil, becomes his principal food, and at the same time his destruction. He thus gradually falls into alcoholism before he suspects it. Chronic and incurable gastric catarrh is set up, the process of nutrition is impaired, pulmonary symptoms become more intensely developed, and thus a combination of circumstances brings about that ruinous state into which the older labourers in the gas-works often fall.

The group described as debility with fever is characterized by a cachectic appearance, with sallow countenance and dulness; it is often complicated with digestive disorders, and not unfrequently with indications of alcoholism. The individuals thus affected often come under treatment for slight febrile attacks of short duration, unattended with local complications, and, while often presenting the general characters of continued fever, having no connexion with typhoid infection. This state is sometimes evidently only a result of digestive disturbance, with or without alcoholism. In some cases, however, it appears as a primary affection, especially in the younger labourers in the retort-houses. A similar state has also been observed by Dr. Petersen in workmen in sugar-houses, who, like those in the retort-houses, have undergone hard labour in a high temperature. He has also repeatedly noticed a sort of acute or sub-acute attack of general debility to come on after a fortnight of night labour, among men beginning to work in the retort-house.

The rheumatic disorders are referable to the alterations of temperature to which the men are subject. They affect those employed in the retort-houses and those employed otherwise nearly equally. Of these affections, the most common form is sciatica. During the year from Nov., 1870, to Nov., 1871, there were two cases of acute articular rheumatism.

Among the diseases not included in the above-named categories were two cases of typhoid fever, six of parotitis, and three of small-pox. Dr. Petersen has been informed that it is a common opinion among the gas-workers that those employed in the retort-houses are but little liable to infectious diseases, especially typhoid infection.

Kingstown (Ireland) Gas and Water Supply.—The commissioners of this township, at their meeting on the 15th inst., determined to go to Parliament next session for powers (*inter alia*) to acquire that portion of the undertaking of the Dublin and Alliance Gas Company lying within the Kingstown district; and also the water supply, at present in the hands of the Dublin Corporation.

Effect of Sulphur Water on Iron Pipes.—Dr. E. Priwoznik, in *Dingler's Journal*, says: "It appears that when the iron mains conveying the mineral water from a source near Hainburg, Austria, were taken up, after having been for more than a dozen years underground, the iron thereof had been strongly acted upon, as exhibited by the difference in structure upon the fracture. On being analyzed, the author found the interior layer to consist, in 100 parts, of—Hydrated oxide of iron $[Fe_2)_2O_3$ $(OH_6]$, 81·08; free sulphur, 12·29; sulphuret of iron, 4·48; hygroscopic water, 057; nickel, cobalt, magnesia, silica, traces of carbon, and chlorides of ammonium and sodium, 1·58. The second layer was found to contain only 79·2 per cent. of iron, but no sulphuret or excess of carbon was discovered; while the third outmost layer was almost pure cast iron."—*Scientific American.*

Constantinople Water Supply.—We announced some time since that the construction of the new reservoir at Ihsandéré for the better supply of the capital with water had been suspended. It has been since stated that the works had been resumed, but this, we regret to find, is not the case. The labourers have been dismissed, and a number of horses employed sold by public auction. We are assured, however, that the enterprise is not definitely abandoned, but will be resumed next spring. The whole affair presents a singular instance of inconsistency and vacillation on the part of the authorities. Old Byzantium was renowned for its abundant supply of water, and rejoiced in the possession of 200 large cisterns and subterranean reservoirs. Of these only 30 are now known in Stamboul, large numbers remaining undiscovered and useless. As these ancient cisterns might readily be turned to account for increasing the water supply of Stamboul, one of the cares of Ismail Pasha, since he has become Prefect of Stamboul, has been to endeavour to bring them to light. His excellency is an archæologist and numismatist as well as administrator, and the task is to him one of peculiar interest. The special explorations entered upon for this purpose have already resulted in the discovery of a large cistern above Oun-Capan, in Stamboul, at a spot called Fil-Tokoushou. This reservoir, supported by 20 marble columns, is 95 pics in length by 28 in breadth, and 10 in height. (A Turkish pic is about 2 English feet.) Three large holes appear to be the orifices of canals or water ducts, the exploration of which will possibly lead to further discoveries. Workmen are now busily engaged in clearing out the rubbish with which the reservoir is choked up; and as it is situated from 10 to 15 pics above the level of the sea, it is hoped to be able to turn it to account, not only for the use of the Oun-Capan district, but for the better water supply of the lower part of Galata, by means of pipes running across the Horn along the upper bridge.—*Levant Herald.*

Trowbridge Water Company.—The first pipe of the new water-works for the supply of Trowbridge was laid on the 30th ult. by the Rev. Horace Meyer, rector of the parish, in the presence of a large and respectable assemblage of townspeople. At a meeting of the company on the same day, Mr. S. Peed in the chair, a report from the directors was presented, which stated that an application was made during the last session of Parliament for an Act of Incorporation, and notwithstanding the directors had to encounter much opposition and many difficulties, they succeeded in carrying their bill through both Houses of Parliament, and the Act of Incorporation received the Royal Assent on the 7th day of July last. In the month of August last a prospectus was issued offering to the public 1500 shares of £10 each. All these shares have been disposed of. Specifications for the pipes required for the undertaking were forwarded to nine of the principal ironfounders in the United Kingdom, and a contract for the supply made with Messrs. J. and S. Roberts, of the Swan Foundry, West Bromwich. The directors believed that the works would be completed and ready for active operation by Midsummer next. Under the Act, power was given to the company to supply water from the source of the river Biss, which the directors consider a great boon and benefit to the inhabitants of the town; for the quantity thus placed at the company's command not only far exceeds that required for the domestic purposes of the inhabitants, but will be supplied to the consumers in a pure state. The manufacturers, too, who might be consumers, would have the advantage of utilizing such water in various ways, as it would be supplied at high pressure. They would also have full compensation for the water taken by the company from the river Biss, in the equivalent supply provided for by the Act of Parliament from Semmington Brook.

WEST OF SCOTLAND ASSOCIATION OF GAS MANAGERS.

The Third Quarterly General Meeting of the West of Scotland Association of Gas Managers was held in the Andersonian University, George Street, Glasgow, on Friday, Sept. 26.

Mr. WILLIAM KEY (Dumbarton), president, took the chair at eleven o'clock, and briefly introduced the business of the day by expressing his pleasure in noticing visiting members of other associations present, and bade them welcome. He hoped that the feeling would at some future time be reciprocated on occasions similar to this, at which they were met for mutual information, and in the interests of gas management.

The SECRETARY then read the minutes of last meeting, at Ayr, and of subsequent committee meetings, which were approved.

The PRESIDENT mentioned that Mr. Malam, of Dumfries, had not so far completed his arrangements as to be able to bring forward his promised paper, which must be deferred till next meeting. He also stated that the vice-president, having received an appointment in Ireland, had resigned his office, although still continuing a member.

On the motion of Mr. LEARMONT, seconded by Mr. MALAM, Mr. Smith (Helensburgh) was elected to the vacancy; and in the room of Mr. Smith, as member of the acting committee, Mr. A. M'AUSLAN (Rutherglen) was chosen, on the motion of Messrs. WILLET and RENFREW.

Mr. M'Auslan not being present, failing his acceptance Mr. Renfrew was elected, on the motion of Messrs. HALL and KIRKLAND.

The PRESIDENT then read the names of the applicants for membership, as follows:—

James Nicoll	Lochmaben.	William Taylor . . .	Forres.
William Dunlop . . .	Hamilton.	Andrew Scott . . .	Musselburgh.
Robert Lambie	Mauchline.	James M'Ewen . . .	Gourock.
James Cochrane . . .	Darvel.	Duncan Urquhart . .	Bervie.
John Ritchie	Kilmaurs.	John Fullerton . . .	Motherwell.
Robert Morrison . . .	Tranent.	John Morton	Muirkirk.
Henry Walker	Saltcoats.	John Cowper	Wigtown.
Robert Reddie	Markinch.	Graham Ross	Stonehaven.
Robert Davidson . . .	Strathavon.	William Houston . .	Kirkwall.
William Fraser	Elie.	John Walker	Ayr.
David Brown	Crieff.	Joseph Clyde	Largs.
		William Marr	Linlithgow.

Mr. WILLIAM SMITH (Helensburgh) proposed that these gentlemen be admitted as ordinary members, which was seconded by Mr. KIRKLAND (New Cumnock), and carried unanimously.

The following gentlemen were also unanimously admitted as extra-ordinary members:—

William Hannay . . . . . Glasgow.	Alexander R. Wright . . Glasgow.
A. Donaldson . . . . . Edinburgh.	

The TREASURER (Mr. Learmont) then read the statement of income and expenditure.

Statement of Income and Expenditure, from Oct. 11, 1872, to Sept. 25, 1873.

RECEIPTS.				DISBURSEMENTS.			
Cash from members to the association funds	£44	1	0	Cash for association . . .	£22	17	7½
Cash to the managers or benevolent fund	72	1	0	„ for benevolent-fund. . .	11	17	1
Interest on deposit receipt . .	0	17	10	„ in bank for association-fund . £21 0 0			
				„ in hand for do. 0 3 4½			
				„ in bank for benevolent-fund . 61 1 9			
					82	5	1½
	£116	19	10		£116	19	10

Association-Fund.

Cash from members	£44	1	0	Books, stationery, printing, rents, postages, rules, and GAS JOURNALS, &c.	£22	17	7½
				Cash in bank, as per bank book . . . £21 0 0			
				Cash in hand . . . 0 3 4½			
					21	3	4½
	£44	1	0		£44	1	0

Benevolent-Fund.

Donations to fund, and members subscriptions	£72	1	0	Benevolent-fund rules, books, printing, postages, gratuity, &c.	£11	17	1
Bank interest	0	17	10	Cash in bank, as per deposit recpt.	61	1	9
	£72	18	10		£72	18	10

Bank Account.

Benevolent-fund, as per deposit receipt	£61 1 9
Association-fund, as per bank book	21 0 0
	£82 1 9

The auditor's report was then read, finding the statement and vouchers for sums debited correct.

Letters were read from J. Z. Kay, Esq., of the Phœnix Iron-Works, relative to models to be shown at a future meeting of the society; from Mr. Hay, of the North British Railway Company, intimating that they had arranged for a special train to convey the members and friends to Maryhill; and from the secretary of the North British Association, regretting his inability to be present at this meeting.

The PRESIDENT remarked on the inconvenience of holding a meeting in December or January, and suggested that the next meeting be held in March, 1874.

On the motion of Mr. INGLIS CAMPSIE, this suggestion was agreed to, the meeting to be held at Hamilton.

The PRESIDENT then addressed the meeting as follows:—Gentlemen, in opening this day's proceedings of the West of Scotland Association of Gas Managers, I rise to do so with some diffidence. But, as we have met here with the same objects in view—not to criticize, but to lend our various experiences in doing something whereby we may all profit, and aid in advancing knowledge in the profession of which we are all members—I shall endeavour to make a few remarks, knowing that any shortcomings will be lost sight of through your indulgence.

This society has in its efforts been more than ordinarily successful. It has now attained to a position, and our meeting in the metropolis of the west, the second city in the empire, for the first time, and under so favourable circumstances, with the prospects before us of a still larger membership, all conduce to cause every member to be emboldened to still greater efforts in the society's behalf. The association now numbers 88 members, and, although perhaps not full grown, is lusty, healthy, and likely to see a good old age.

For my own part, I have to allow that I have received more lasting benefit from being a member and meeting with the members of this society since its formation than I had experienced in many years previous. But I also report my confirmed opinion—and without any disparagement—that I have noticed a decided improvement in intellectual vigour among the attending members. I find that gas managers who, before casting in their lot with us, were apt to keep themselves aloof, and their experiences all to themselves, giving all sorts of reasons against such societies and friendly meetings for conversational intercourse (no doubt these prejudices were the result of a mind entirely left to its own diction)—these, I am happy to state, are as loud in favour as formerly they were against, while I find others who feel more able than previously they thought they were for larger undertakings.

Rome was not built in a day, neither can we expect that every gas manager and gas maker in charge of the lesser works can in one year have become aware of the objects of this society and the many benefits of membership; still we have many inducements to be hopeful, and have every confidence that gas companies will see it is to their best interest to defray their managers expenses of membership and of meetings, which I can testify will be found an investment that no other expenditure so trifling will show a like return.

The funds of the association are such as to show that it has many well-wishers and earnest supporters. The past year has seen some good done through the means of the Benevolent Fund, and, although this fund is not yet as your committee would have wished, they trust that the fund will not be forgotten when more encouraging circumstances visit the gas undertakings.

Your committee have received statements from upwards of 100 gas-works, in reply to their circular, stating the volume of gas made per annum and the price per 1000 feet, and they have to inform you that the average manufacture is found to be 5,886,000 feet, and the average price per 1000 feet for works making that volume—or, rather, the average of the whole statements received—is 8s. 3d.

The committee are anxious to furnish each contributor to this information with a printed copy, in alphabetical order, giving town, name of manager, gas made, price, &c., and as they will be issued in about 14 days, those who have not sent in should now do so without delay.

Your committee in its duties have had many encouragements, and, amongst others, offers from gentlemen interested in the society's progress, of money for prizes to aid, as was suggested, in securing papers for meetings. Your committee, while thanking the proposers, agreed that prizes for papers at such meetings as ours did not bring about the result wished for; but considered that it would tend to lessen the feeling that ought to exist of individual earnestness in promoting the society's welfare and spontaneously coming forward, as also it would encourage, in the earnestness of prize-seeking, a want of originality, the copying and using the ideas of others, which it would be better not to engender.

Self-reliance in these days is of the first importance, and I would rather see prizes given for all Scotland to him who, after the proper investigations, has been found to have made the most gas per ton of coal, and received cash for the largest proportion of that manufactured, taking into account the relative values of coals used. And meantime let one and all of us, with the energy, perseverance, fortitude, and prudence characterizing us as a nation, try, and individually keep, as we have kept, a stage in advance in most things connected with gas-works management.

Yet, gentlemen, in one thing I am convinced we are behind that of our southern brethren and those in the Sister Isle, not from any want of efficiency, yet we are seriously behind the time in which we live; and I assure you you will never have much larger works to manage, a much easier satisfied consumer, nor anything like a dividend at all, until we have so improved our modes of manufacture as at least to equal our southern friends in being able to give *a gas of like illuminating power*. In this we are behind; we could not make it, or if we do not, why the onus rests with us until we do.

We can only give an illuminating power of from 22 to 30 candles; let us be able to make—ay, and to *sell*, 14 to 16 candle gas, a quality every person in England is pleased with, and every person in the community of Scotland would be equally so. We are losing sight of our own interests as gas managers, as consumers, and as gas stockholders, in thus keeping up an unequal contest. We are heavily taxed by this burden of expensive lighting; we are wastefully using up the already scarce commodity of good cannel coal. In equalizing the illuminating power of gas over the whole empire it would simplify legislation on the subject, and preserve our rapidly-decreasing supplies of first-class cannel coal for an infinitely longer period.

Since we last met together several new designs have been made public in the JOURNAL OF GAS LIGHTING for apparatus in gas manufacture, and I have to draw your attention to the most valuable of these.

The first is the horizontal condenser, described in the issues of the 26th of August and the 9th of September. When the tubes are made of sufficient size, I consider these condensers by far the most profitable and effective. They are laid at declivities, as shown in the diagram, and I would suggest that for small works up to 5 millions per annum the pipes should be no less than 10 inches inside diameter; and to 15 and 20 millions, not less than 14 to 16 inches, with rounded elbows at ends. According to the size of the work would the amount of piping of the above sizes require to be considered.

The objects claimed for this form of condenser is a better illuminating power of the gas, and a greatly increased strength of ammoniacal liquor.

We have also before us to-day a diagram of "Laidlaw's Compensating Bye-pass Governor." It is on a large scale, and shows the working of the governor and bye-pass valve very distinctly; also, on the table for your inspection, one of "Laidlaw's Compensating Meters," with glass front. The other designs before us, by the same engineers, are very interesting.

Mr. Ross, a respected member, has kindly furnished us with samples, productions from the secondary products of our gas-works, prepared by him at his chemical works, in the form of crude naphtha, creosote oil, carbolic acid, benzole, solvent naphtha, burning naphtha, anthracene, naphthaline, sulphate of ammonia, and pitch.

Mr. Nelson, of this city, has also kindly sent sample wood sieves for purifiers for our inspection, and from their appearance I have every confidence they will work cleanly and be very durable, much more so than either wrought or cast iron trays.

The PRESIDENT then drew the attention of the members to the arrangement agreed to at the last meeting, whereby as many of those present as possible were to experiment on the method of purifying brought forward by Mr. Hunter of Rothsay.

Mr. KIRKLAND (New Cumnock) said he had used the ashes, and found that the lime kept much longer clean, but he had no station-meter to give the exact amounts purified with and without the ashes.

Mr. FOSTER said he had found the use of breeze on the first sieve of the purifier very beneficial in preventing the lime caking and in extracting tarry matter.

Mr. KEY: Mr. Hunter asserts there is a purifying power in the ashes and dander taken from the pits.

Mr. HALL: Coke does very well when washed in a scrubber; the lime in purifiers is then kept open and in working order much longer.

Mr. KEY: I have tried the process in three changes of purifiers, but found that the volume of gas purified was less by the number of sieves with ashes; if one sieve in three, there was as near as possible one-third less purified. But I have noticed that there was much more foul gas passed after a clean purifier of all lime was put on than when there was the first sieve of ashes.

Mr. HUNTER asserted that he still continued to use it. There was always some coke in the pit ashes, but to this little impurity attached as compared with the clinker.

Mr. FOSTER then read a paper on

THE MANUFACTURE OF GAS FROM A MIXTURE OF TAR OIL AND DROSS.

Mr. President and Gentlemen,—The subject of this paper—viz., "The Manufacture of Gas from a Mixture of Tar Oil and Dross"—is one that I would have wished had been placed in more able hands, for this reason—any

subject treating on the producing of gas at a cheaper rate than the present system is all-engrossing, and would require to be ably handled. Two years ago gas managers, with very little care or trouble, could make gas and sell it at a cheap rate, and still have a good balance on the right side of the ledger; but times are changed, and it will require very fine manipulation to make ends meet at the end of the year. If by this or any other means we can keep down our coal account, it will be better for our shareholders, the public, and likewise ourselves.

This tar oil, as it is called, is the product remaining after the paraffin oil has been taken off. It much resembles coal tar in appearance, but smells strongly of paraffin. I am told it can be got in large quantities at any paraffin oil-works.

It is now about six months since I commenced to use this mixture, during which time I have tried it in every possible manner; and up till within a fortnight ago, I used rather more than 75 per cent. in the producing of gas for lighting the town of Portobello. From statistics which I will submit to you in this paper, you will be able to judge for yourselves the benefits to be derived from using it.

The first experiment I made I had 17 cwt. of limerigg dross and 3 cwt. of tar oil, The results were—

Gas from mixture	10,100 cubic feet.
Durability of 1 cubic foot, with 5-inch flame	55 minutes.
Illuminating power of 5 cubic feet	27·50 candles.
Value of 1 cubic foot of the gas in sperm	660 grains.
Weight of coke	1338 pounds.

Cost of Material.

17 cwt. of limerigg dross, at 13s. 6d. per ton	11s. 5d.
3 cwt. of tar oil, at 30s. per ton	4 6
	15s. 11d.

According to this analysis I had upwards of 27-candle gas at a little over 1s. 7d. per 1000 cubic feet. This, of course, does not include labour, nor any expense connected with the manufacture.

I found, however, in this experiment, that 3 cwt. of tar to 17 cwt. of dross was rather wet, and brought down the heat of the retorts; I, therefore, in my next trial, used 20 cwt. of dross and 3 cwt. of tar, and I found this mixture work so well I have never changed.

Gas from 1 ton of this mixture	10,500 cubic feet.
Durability of 1 cubic foot, with 5-inch flame	50·25 minutes.
Illuminating power	24·39 candles.
Value of 1 cubic foot of the gas in sperm	585·36 grains.

According to this analysis I had nearly 24½-candle gas, at 1s. 8d. per 1000 cubic feet. In all my experiments during the last six months, and they have not been few, the results were—

Maximum quantity, per ton	10,700 cubic feet.
Minimum " "	10,000 "
Average " "	10,350 "
Ditto illuminating power	25 candles.
Ditto durability (5-inch flame)	52 minutes.

The above experiments were all made in the ordinary way of working, six clay retorts being used, 8 feet long by 14 inches diameter; weight of charge, 1¼ cwt.; time taken in carbonizing, from 4 to 4½ hours.

The coke produced from this mixture, if a caking dross be used (such as limerigg or blackband), is very valuable, and I can command a ready sale for it, at 20s. per ton, for using in the furnaces for heating the retorts. Nothing in the shape of coke I have ever seen can beat it; and it is much more durable than the coke produced from cannel coal, thereby leaving a larger quantity for sale, and entailing less work in connexion with the furnaces.

This tar contains merely a trace of sulphur, therefore its action on the purifiers is very easy.

Mr. Boyd M'Crae (Dundee), in his very able address at the last meeting of the North British Association of Gas Managers, held in Edinburgh, impressed on the meeting the great necessity there was for gas managers taking the greatest possible amount of gas from the coal, thereby economizing coal. If this were done less coal would be required and the demand lessened, for it is owing to the great demand and the diminished output that has caused cannel coal to advance to such enormous—shall I say extortionate prices? If, while doing this, we gas managers were to use a proportion of this mixture, suppose it were only 1-10th or even 1-20th our yearly quantity, it would greatly assist in keeping down the demand, and I am confident in stating would show good results on the balance-sheet at the end of the year.

Gas companies in England and other places take yearly from Scotland large quantities of cannel coal for enriching their gas. I am perfectly convinced if they were using this tar oil in the proportion of 1 to 20 it would bring up their illuminating power from 12 candles, the average production of their coals, to 16 candles, which is, I believe, their average standard.

I would ask that every gas manager at this meeting give this a fair and impartial trial. You do not require to alter any existing arrangements to do so, and the cost for the quantity of material would be a mere trifle. All that would be required for a trial would be 1 ton of dross and 3 cwt. of tar oil, any quantity of which can be got at any paraffin oil-works at not more than 1s. 6d. per cwt. Mix the tar and dross intimately the one with the other, and charge in the usual way, taking care not to charge too heavy, and in as regular a layer as possible in the retorts, and not work your charge too long.

I may state that I am not the only one who uses this mixture; Mr. Cusiter (Dalkeith) and Mr. Scott (Musselburgh) have used it very successfully for the last two or three years, and both parties analyzed it very minutely, and their results are even better than those stated by me.

There are many points I have purposely left out in this paper connected with this subject which I think may be better brought out in discussion, as I consider that more information can be got in a meeting of this kind in that way than could be gained by the most elaborate of papers. I can only state that any information or explanation that I can give is entirely at your disposal.

Mr. Learmont said he had tried this plan on a small scale in the proportion of 1 ton of dross to 3 cwt. of tar oil. The quality he had found quite up to the mark quoted by Mr. Foster, but he had to employ seven retorts instead of five, so that for him it was quite unsuitable. The coke, too, came out small and fell through the bars of the furnace, and was therefore of no use.

Mr. Key: Do you mean by using more retorts that it took too long a time to take the gas off by this process?

Mr. Learmont: The charge lying so close prevented the heating up of the retorts.

Mr. J. Renfrew: I have used this method with half a ton of dross and 2 cwt. of tar oil. In my case, as in Mr. Learmont's, the dross came out in ashes, and, instead of from two to two and a half hours, four and four and a half hours were needed in running the charges. There was also a difficulty in putting on the lid of the retort on account of the flames, which was the chief cause of my giving it up.

Mr. Hunter said he had used ordinary coal tar mixed with sawdust, but had no apparatus to test the quality, and had obtained double the quantity per ton than from the gas coal, experiencing the same difficulty in putting on the lids, and had to desist on account of the choking of ascension-pipes.

Mr. Renfrew remarked that his ascension-pipes choked every charge.

Mr. Clyde (Largs) said that nine or ten years ago, when M'Kenzie's patent was taken out, he went to see it working. Various kinds of dross was used, but no matter what it was, it came out of the retort as small as it went in, except that from one pit alone, near Paisley. Soft coal brought from England made a good coke. He could state that even with the oil and dross the gas was nothing like what was made from cannel coal, and, if everything was considered, the expense for tar oil would be equal. He was referring merely to M'Kenzie's patent. The experiment lasted for three or four days.

Mr. Jeffrey: I have tried both M'Kenzie's patent and "Greenshield's method." Dry ashes were left in the retort in the first case, but in the latter the coke was all in one piece, so that the result depends upon the kind of dross used; 27-candle gas was expected, but I only got 22.

Mr. Cusiter (Dalkeith): For the last four years I have wrought this tar oil and dross, and have had no reason to regret it, and the results have been very similar to those given by Mr. Foster. It is possible to use a non-caking dross, but if it has no such inherent tendency the oil will not impart it. I have also mixed it with sawdust and obtained a large quantity of gas of good illuminating power, but, of course, worthless coke. In reply to Mr. Key, he added that he had found no greater difficulty, with the mixture as to choking in the ascension-pipes, than with cannel coal. This evil could be prevented very much by using a small dip in the hydraulic main and by keeping the mouthpieces clean. It was from these that the mischief chiefly arose, although the richer the material the greater the tendency to choking, still he held the mixture had no greater tendency than coal.

Mr. Hall: Do you use an exhauster?

Mr. Cusiter: I am not using an exhauster.

Mr. Scott (Musselburgh): Some members have found a difficulty in keeping up the heat of their retorts with the mixture, but the remedy for this is very simple. I use one-third of the mixture along with cannel coal, and the retorts work off at their proper time.

Mr. Foster: I have used the tar oil with a bad caking dross, with the bad results referred to. Like Mr. Scott, I have used the mixture along with parrot coal. Another way to effect the same object is to leave in half of the coke, and charge rapidly on the top. In this way you can charge every two hours, and get good success. Of course the flames are pretty strong for the stokers.

Mr. Hall suggested that another difficulty might be that, in case of tar oil being in demand for this purpose, it would rise in price, thus rendering the process as expensive as the other, and remarked that no good caking dross was to be had from the pits in this locality.

Mr. Foster: I find that the gentlemen who have already spoken have answered the objections proposed, just as I would have done. I find no trouble in the matter of choking, and have also a good coke.

The President, referring to Mr. Foster's statistics, said that the results seemed to be very good, the chief difficulty being the extra expense of procuring a proper dross in this locality.

A vote of thanks was accorded to Mr. Foster for his paper.

(To be continued.)

EAST LONDON WATER-WORKS COMPANY.

At the Half-Yearly Meeting of the Proprietors, held at the Office, 16, St. Helen's Place, on Thursday, the 2nd inst., the following report was presented and adopted:—"The half year's accounts to Midsummer, 1873, duly audited, are herewith submitted to the proprietors. The water-rents, compared with the corresponding half year in 1872, exhibit an increase of upwards of £5000. The expenditure chargeable to revenue, compared with the same half year, shows an increase of nearly £6000. Of this amount upwards of £3000 is to be attributed to the increased cost of pumping expenses, arising from the high price of coal and labour. The additional establishments at Hanworth and Sunbury, together with the large increase of the works on the Lea River, necessarily add to the current expenditure. The extensive works of the company are carried on with a strict regard to economy. The capital account shows a balance unexpended of £6589, but the purchase-money for Chingford Mill has yet to be paid. Since the year 1867, when the Acts passed authorizing the construction of works for obtaining a supply from the Thames, and for largely increasing the works on the Lea River, upwards of £600,000 capital has been expended, upon which a dividend is now chargeable. The reserve balance accumulated from time to time will now become available, when necessary, to maintain the usual rate of dividend, notwithstanding the increase of capital. A breakage in the main supplying a small district at North Woolwich has been caused by the works carried on by the Victoria Dock Company, leading to much inconvenience to the inhabitants of the district, and rendering the supply difficult to maintain. The repair is being effected by the dock company. With this exception, all your works, machinery, and property are in good order. The introduction of the constant supply, in compliance with the Metropolis Water Act, 1871, into a district in the parishes of Shoreditch and Bethnal Green, referred to in the last report, has occasioned a very large increase in the quantity of water pumped. This is to be attributed to the waste caused by the imperfect fittings in the district. Although due notice was given to the Metropolitan Board of Works, and publicly by advertisements inserted in daily and other newspapers circulating in the district, notice also having been served upon all owners or occupiers of premises of the intended change from intermittent to constant supply, but few of the required alterations in the fittings were made until the three months time allowed had expired. Great progress has since been made in carrying out the regulations, and the change will, it is hoped, introduce an improved mode of supply, and at the same time diminish the great waste that has hitherto existed. The directors have brought under the notice of the Metropolitan Board of Works the importance of a proper provision in case of fire being made, by fixing hydrants in different localities of the metropolis. The quantity of water pumped during the half year ending at Midsummer last was 3,994,889,624 gallons, being a considerable increase over the quantity pumped during the corresponding period of 1872. The flow of the Lea River has been abundant, but the large delivery has rendered it desirable to keep the Thames supply works in action on a limited scale, and the ease and convenience with which this supply can be used to supplement that from the Lea is highly satisfactory. The official report of Major Bolton to the Board of Trade and the Local Government Board of the company's works and supply has invariably been favourable. During the half year 9718 yards of pipes of all sizes have been laid, and 753 new houses have been laid on. The directors recommend that a dividend at the rate of £3 per cent. for the half year on the ordinary stock, of £2 5s. per cent. upon the shares created April 2, 1868, and of £2 5s. per cent. upon the debenture stock, all clear of income-tax, be declared, payable on the 10th of January next in the usual manner.

GAS LIGHTING IN NEW ZEALAND.

From the *Auckland Weekly Herald* of March 1st we extract the following account of the opening of the gas-works at the Thames Gold Field, in the neighbourhood of that town:—

"On Saturday night several of the principal stores were lighted up with gas for the first time, and this caused a little excitement among the community, many of whom turned out, in spite of the wet weather, to witness the effect; and the comments thereupon, as against the old mode of lighting—*i.e.*, kerozene lamps—were very favourable, and have, doubtless, caused many waverers to decide to have gas laid upon their premises, where convenient. The supply was confined to Graham's Town on Saturday, but to-night Shortland will also receive its fair share. At the Academy of Music there was a splendid illumination on the balcony, where a semicircle of 27 jets exhibited amazing brilliancy, and attracted great attention. The footlights in use at the diorama exhibition were gas-jets. Messrs. Marshall, Reid, and Herbert's drapery establishments were

also brilliantly lighted up; and Messrs. Menzie and Dey's, confectioners, Davies's Onehunga Store, Brearley's and Townsend's butcheries, and several other places of business, were illuminated with gas. The management of the company made every effort to be in readiness by Saturday night, and the result above shows how entirely successful they were. In visiting the works this morning, it was amazing to find how much work had been done in so short a time; and it was a source of gratification to see on this field, for once, how a large job can be turned out when undertaken by a private company. It is only two months ago since the last portion of the plant was landed, and yet there has been fully 4½ miles of mains laid, varying in size from 3 to 5 inches, the greatest proportion being the larger sizes. The retort-house is a large brick building, 71 feet by 30½ feet, holding two benches of retorts, while communicating with this, on the outside, is the gasometer, 50 feet in diameter by 15 feet deep. The requisite storehouses, smiths shops, secretary's and manager's offices, are also receiving the finishing touch; and in a very few days the Thames plant may be reckoned as one of the most compact in the colony, as it is a *fac simile* to that of Auckland, and capable of supplying equally as much, or about 10 million feet of gas per year. Already 60 meters are connected with the main, and the applications in hand number 200, which are daily receiving fresh additions; while the principal batteries on the flat will be illuminated by this day month. The directors of the company left the construction of the works and plant to Mr. Atkinson, the engineer to the Auckland Gas Company, who prepared the plans, &c., which have been faithfully carried out by Mr. Wilson, the resident engineer, and to these two gentlemen the thanks of the Thames people are due for the expedition used, the former gentleman having paid a weekly visit during the time the works have been in progress. Mr. Lewis, the secretary, has been no less indefatigable in his efforts to forward the interests of the company, having waited personally upon the storekeepers and householders, to whom the supply would be of the greatest advantage."

The following towns in New Zealand, placed in the order of the establishment of the companies, are now lighted with gas:—Dunedin, Auckland, Christchurch, Wellington, Greymouth, Port Chalmers, Shortland and Graham's Town.

BALANCE-SHEET OF THE AUCKLAND GAS COMPANY, LIMITED.

Dr. *June* 30, 1873. *Cr.*

Capital			£30,000	0	0	
Number of shares in the company	6,000					
Shares disposed of	5,850	29,250	0	0		
Shares not disposed of	150	750	0	0		
		£30,000	0	0		
3,800 original shares of £5, all paid up		£19,000	0	0		
150 original shares, sold at a premium		1,476	5	0		
1,900 new £5 shares, sold at a discount		4,977	5	8		
Additional sum taken from income, expended in completing works		3,256	5	1		
Amount owing by the compy.		87	16	7		
Dividend unclaimed		2	10	0		
Reserve-fund		1,500	0	0		
Profit and loss		2,193	15	0		
		£32,493	17	4		
Immovable property—						
Freehold land					£1,482	3 9
Freehold buildings and plant, including mains and meters					27,329	0 5
Moveable property—						
Stock of coal, &c.					772	5 0
Stock of residual products					30	0 0
Amounts due to the company					280	14 11
Cash in the Bank of New Zealand					1,565	13 3
Cash invested in Government Debentures					1,034	0 0
					£32,493	17 4

Profit and Loss.

Coals, &c., carbonized		£2,598	0	4	£8,961	6 4
Stokers wages		477	17	0	774	18 5
General expenses—					82	17 1
Directors and auditors fees		250	0	0	5	14 0
Insurance		8	5	0	1	15 0
Salaries		811	0	0		
Stationery, printing, advertising, and stamps		76	4	5		
Rates and taxes		62	5	0		
Petty cash		21	3	9		
Legal expenses		15	6	8		
Rent		165	0	0		
Inspecting meters		72	5	6		
Government Licence		15	0	0		
Mains, service-laying, &c.		1,317	4	8		
Wear and tear		601	2	8		
Meters		1	1	0		
Balance down		3,334	14	10		
		£9,826	10	10	£9,826	10 10
Balance at credit, June 30, '72					£1,734	0 2
Balance brought down					3,334	14 10
					£5,068	15 0
Dividend declared on July 24, 1872, and interim dividend on Jan. 30, 1873					2,875	0 0
					£2,193	15 0

ADVANCES IN THE PRICE OF GAS.—The Edinburgh and the Edinburgh and Leith Gas Companies have announced an advance from 5s. 6d. to 6s. At Middlesborough the price is to be raised from 3s. 2d. to 3s. 4d. At Alyth, N.B., the price has been raised 1s. 8d., and the discounts to manufacturers reduced. A local journal states that the Bristol United Gas Company have determined upon an increase of 6d.; and at their meeting on Friday last the Halifax Gas Committee reaffirmed their resolution to recommend the council to increase the price of gas in the borough from 3s. 8d. to 4s. per 1000 cubic feet, and in the out-districts from 5s. to 5s. 6d.

FORFAR GAS COMMISSION.—At the meeting of the commission, on the 1st inst., Mr. Rutherford gave notice of his intention to call attention to the extravagant and illegal manner in which the funds of the commission are wasted by several of its members at the annual trip to Carnoustie, where on the last two occasions upwards of £40 (of which about one-half was for liquor) was spent, and that the board resolve that in future this expenditure be discontinued.

PAISLEY (CORPORATION) GAS SUPPLY.—At the meeting of the Paisley Town Council on the 14th inst., the provost, in moving the adoption of the minutes of the Gas Committee, said that they had obtained a Provisional Order for increasing the price of gas to 6s. per 1000 cubic feet, instead of 4s. 2d., which was the maximum price under the Act. He was sorry to say that during the interval which had passed since the old rate was fixed they had sustained a loss of £300 or £400. He proposed that the rate on and after the 15th inst. be 5s. per 1000 feet. He also proposed that it be remitted to the committee to ascertain the terms and other information as to the supply of gas to the community by the Abercorn Shale Company.

HULL GAS SUPPLY.—The report of Mr. Baynes, pharmaceutical chemist, for the month of September, shows that the quality of the gas sent into the Sculcoates and Myton district by the British Gas Company maintained its usual standard of illuminating power and chemical purity; its light-giving power averaged a little over 14½ candles. At no time was sulphuretted hydrogen or free ammonia present to the ordinary tests. The results for the month, with Sugg's standard burner, are:—

	Max.		Min.		Mean.
Illuminating power in standard sperm candles	15·13	..	14·08	..	14·57
Grains of sulphur per 100 feet	29·70	..	24·10	..	27·15
Grains of ammonia per 100 feet	—	..	—	..	0·60

Mean barometer and temperature in experiment room—Bar., 30·09; temp., 62°

GAS COAL IN BRAZIL.—A fact of considerable importance with reference to the coal supply of Brazil has recently been ascertained by the Imperial Brazilian Collieries Company. The neighbourhood of San Jeronymo has been explored by this company, the result being the discovery of two splendid seams of coal, measuring in the one case 3 feet 4 inches, and in the other 3 feet 10 inches, which must yield immense quantities of good gas and steam fuel. These seams were reached when Mr. Laitz, one of the directors of the company, was at the collieries, and he expresses himself as being very confident that the best results will attend this discovery. To facilitate the transport of the coal to Port Alegre, a railway about 9 miles in length has been constructed, under the superintendence of a young engineer, Mr. Wm. Tweedie, and is now in excellent working order. On July 19 the railways and collieries were formally opened by his Excellency the President of the Province of Rio Grande do Sul.—*Engineer.*

SUFFOCATION BY COAL GAS.—A singular case of death was reported last week as having occurred at Wellington College. A boy of 14, named Clifford, slept in a room said to have been imperfectly ventilated. In the morning the room was found full of gas, and the boy was dead in bed. The *Boston* (U.S.A.) *Medical and Surgical Journal* states that three men were recently brought to the City Hospital who had been nearly suffocated by inhaling coal gas. A fourth occupant of the room in which these men had slept had died. Fresh air and stimulants were resorted to, but the most marked effects followed the administration of oxygen gas. The inhalation of this agent was followed by an almost instantaneous improvement in the condition of the patients. This relief was followed at first by a relapse whenever the administration of the gas was discontinued. Soon, however, the improvement became permanent, and the patients were discharged well.

GAS-POISONING.—The melancholy accident at Wellington College, whereby a young lad was killed by the escape of coal gas into his sleeping apartment, brings powerfully to our notice the fact that we employ a most potent poison as one of the necessaries of modern existence. The poor boy was found dead in his bed. He probably had fallen into that deep slumber which children alone enjoy, and from which the noxious and odorous atmosphere which killed him did not unfortunately arouse him. Death from the inhalation of coal gas seems to be painless; and the victims of it have generally been found in some attitude of repose, their countenances retaining all the placidity of slumber. The sufferers do not seem to be tormented by the terrible sensations of suffocation; for it has been observed that it is rare to find any indications of an attempt to escape the impending fate. The most noxious ingredient of coal gas is stated to be carbonic oxide, of which most samples of gas contain from 7 to 8 per cent. by volume. That this gas is intensely poisonous—far more so than carbonic acid—is well known; it is, in fact, stated to be the most poisonous of all the gases properly so called. M. Tourdes has shown that an atmosphere containing one-fifteenth of its volume of pure carbonic oxide will kill a rabbit in 23 minutes, and that half this amount produces death in 37 minutes. Death is produced, according to Claude Bernard, by a paralysis of the red corpuscles, which brings to a standstill their power of absorbing and carrying oxygen. Prof. Christison, in his work on poisons, states "that the powerful odour of the gas (coal gas), when it accidentally escapes in the night-time, generally awakes very soon those who are exposed to inhale it." It is fortunate that such is the case; and this and similar facts are strong arguments against the introduction of inodorous gas for illuminating purposes. This accident, too, brings to mind the imperfections of modern building. It is strange that in the construction of houses we so seldom find any arrangement for the proper, safe, and wholesome combustion of gas. What would be said of a builder who omitted fireplaces, flues, and chimneys from the plans of his buildings, and who warmed his houses by pans of coals in the very centre of the rooms, leaving the visible and invisible products of combustion to escape as best they could? It is not probable that in one house in a thousand any proper arrangement would be found for the combustion of gas, or any flues whereby the products of such combustion could escape. Gas is gradually getting into disrepute: it flares, it roars, it flickers, it smells, it tries the eyesight, and spoils all decorative furniture; and, as a result, we find that oil is displacing its powerful rival in the houses of all who can afford to be luxurious. Who is to blame for this? Surely not solely the gas manufacturers, but the builders as well, who construct houses without giving any thought as to the mode in which they are to be lighted.—*The Lancet.*

SINGULAR EXPLOSION OF A GAS APPARATUS AT WAKEFIELD.—On Saturday evening, Oct. 4, a most singular occurrence took place at Wakefield. Some few weeks ago it was discovered that Mr. John Barron, cheese, butter, and bacon factor, in Cross Square, was taking gas direct from the mains instead of allowing it to pass through a meter, both at his place of business and at a villa residence owned and occupied by him just outside the borough. The gas company prosecuted him before the magistrates, and he had a large sum to pay in fines, penalties, and expenses. As is usual in such cases, the gas company declined to allow Mr. Barron to use gas after he had defrauded them, and up to Saturday evening he lighted his establishment with paraffin lamps. Recently Mr. Barron purchased an apparatus patented by a company in London, known as the Air Gaslight Company, Limited, and he received it on Saturday. Shortly after half-past six o'clock in the evening Mr. Barron was, it is said, fixing the apparatus in the cellar under his shop, when a paraffin lamp fell upon the floor and ignited some gasogen, a gallon and a quarter of which yields nearly 1000 cubic feet of gas. The floor of the shop and a quantity of straw, paper, empty boxes, &c., were set on fire, and it was feared that the whole of the premises, with the large stock of goods, would be destroyed. The Borough Fire Brigade, however, were quickly on the spot, the flames were speedily extinguished, and the damage was not very considerable. The shop, which was surrounded by a large crowd of persons, was closed between seven and eight o'clock, and it was thought that all danger had passed. Mr. Barron, however, appears to have renewed operations in the cellar, and it is said that Mrs. Barron was looking on whilst he endeavoured to fix the apparatus. About a quarter past eight o'clock a second and far more terrible explosion took place, and the whole neighbourhood was shaken and alarmed. Mr. Barron was most frightfully injured. The skin was almost blown off his arms and hands, and his neck was also much burnt. After his injuries had been washed with oil at the shop of Mr. Cardwell, druggist, he was taken home in a cab. His face became much swollen, he was deprived of the use of his eyes, and his throat was in a shocking state. Mrs. Barron, who as well as her husband rushed through the volume of fire, escaped with very slight injuries beyond the singeing of her hair. The shop and the goods were much damaged, the window and shutters were blown out, and the adjoining property has also suffered. In the house occupied by Mr. E. Hall, fruiterer, the staircase has been thrown out of position, and the family were unable to get up to bed. A charwoman who was coming out of Mr. Hall's cellar when the explosion occurred, with a candle in her hand, was injured on the head, and one of Mr. Hall's sons, who was with her, received a severe shock. An immense number of persons gathered in Cross Square, and great excitement prevailed until the police removed the apparatus to the police station.

BEQUEST TO THE IMPERIAL GAS COMPANY.—The *Illustrated News* says: "Mr. William Kensett, by his will, proved in October, 1855, seems to have been of the same opinion as the members of a recently-formed club, who have pledged themselves, for sanitary reasons, to have their bodies burnt at their deaths, for he recites that, 'believing in the impolicy of interring the dead amid the living, and as an example to others, I give my body, four days after death, to the directors of the Imperial Gas Company, London, to be placed in one of their retorts and consumed to ashes, and they will be paid ten pounds by my executors for the trouble this act will impose on them in so doing. Should a defence of fanaticism and superstition prevent their granting this my request, then my executors must submit to have my remains buried, in the plainest manner possible, in my family grave in St. John's Wood Cemetery, to assist in poisoning the living in that neighbourhood.' Generally, curious wills are home made. The will of Mr. Kensett was made by a solicitor."

EXPLOSION OF GAS.—The City of London Club, Old Broad Street, was on Friday last the scene of an alarming and serious disaster. For nearly three months the club has been in the hands of the firms of Messrs. Laurence and Son and Messrs. Crace, who are entrusted with the septennial repairs, alterations, and decorations of this, the leading club of the City. The wine-cellar doors had been bricked up during the recess, but on Thursday and Friday the bricks were removed, when the steward discovered a strong smell of gas, and cautioned the men employed not to enter. The door was left open for a considerable time to allow the gas to escape, but, unfortunately, Mr. Haines, the butler, ventured in too soon with a light, when a fearful explosion took place, shattering doors, windows, and even bars of iron, and scattering them into fragments, severely burning the butler, and a labourer named Field. The former, notwithstanding his serious injuries, rushed back to rescue Field, and succeeded in dragging him out. Both are, up to the present, progressing favourably, though not by any means out of danger. Field was at once conveyed to St. Bartholomew's Hospital, but Haines remains in his apartments at the club. Strange to say, the extensive stock of wines remained comparatively uninjured, considering the havoc caused by the explosion.

A GAS-PROPELLED BOAT.—Mr. William A. Leggo, of Montreal, Canada, is the author of a novel method of propelling vessels, designed especially for canal boats, to overcome the difficulties of horse towage. He discards steam, wheels, ropes, and other common contrivances. All that Mr. Leggo uses is a large bent pipe, which is attached to the stern of the vessel, the mouth of the pipe being placed under water, pointing stern-wise. The pipe rises to the deck, and at the upper end of the pipe is a gaslight and valves that open inward for the admission of hydrogen gas and atmospheric air. As soon as enough hydrogen and air have entered—to wit, two parts of hydrogen to one of oxygen—the mixture takes fire from the gaslight, an explosion ensues, the valves are closed, and the great pressure produced finds vent at the mouth of the pipe, acting against the water and driving the boat ahead. The valves then open again, the gases flow in, a new explosion takes place, and so on. These explosions follow with as much rapidity as the motions of a steam-engine piston, and thus the boat soon acquires a regular velocity. Whether the manufacture, cost, and storeage of the gas, and the working of the gaseous motor, will equal the economies and conveniences of steam power and its propelling appurtenances, remains for Mr. Leggo to ascertain by trial.—*Scientific American.*

EXHIBITION OF APPLIANCES FOR THE ECONOMICAL CONSUMPTION OF FUEL.—The council of the Society for the Promotion of Scientific Industry, looking to the enormous waste there is in the consumption of coal, whilst its cost is every day increasing, have resolved that an exhibition shall be held in Manchester of all appliances and apparatus that tend to the economic use and saving of fuel, for the purpose of inducing attention to, and eliciting opinions of practical men on, the matter; and of giving all consumers of coal an opportunity of comparing the various appliances, with a view to their adoption of that which will best serve their purposes. The exhibition will comprise—1. Appliances which may be adapted to existing furnaces, &c., whereby an actual saving is effected in the consumption of fuel. 2. Appliances which may be adapted to existing furnaces, &c., whereby waste heat is utilized. 3. New steam generators and furnaces, boilers and engines specially adapted for the saving of fuel, and appliances whereby waste products are utilized and the radiation of heat prevented, &c., &c. The exhibition will include appliances used for manufacturing, agricultural and domestic purposes. Either the apparatus itself, or diagrams or models, may be exhibited, and no limit is placed upon the class of article to be exhibited.

DUNDEE GAS COMMISSION.—The Works Committee of this Commission held a meeting on the 25th ult., at which the manager submitted a report regarding the cost of the lighting of the streets. It stated that, in consequence of the higher rate of wages now paid, and the increased cost of all the materials used, the commission could not without loss continue to do the work at the present rates. The manager had carefully gone over the calculations, and found that for furnishing and erecting each new lamp on pillar, with paned lamp, there would have to be an increase of 12s.; each new lamp on pillar, with globe lamp, 13s.; each paned lamp on bracket, 3s. 6d.; each globe lamp on bracket, 4s.; for each lamp-pillar shifted, 4s.; for each bracket shifted, 2s. For lighting, extinguishing, cleaning, repairing, painting, and storing of lamps there was an increase of 1s. on each. The report was unanimously adopted by the committee, and also by the board at their meeting on the 1st inst.—Messrs. Duncan and Warden, the visitors for the past month, reported to the commission that that day they had gone over the works, and were highly satisfied with the good order of the several departments of them. By the agreement with the contractors for the new gasholder that was the day on which they were bound to hand it over to the commissioners, and it was very gratifying to find that the holder was completed within the time, and in so satisfactory a manner as it appeared to be.—The meeting remitted to the two conveners, and to Messrs. Thomson and Warden, along with the clerk and manager, to arrange for the formal opening of the gasholder.

EDINBURGH WATER SUPPLY.—At a meeting of the Town Council of Edinburgh, on the 10th inst., it was resolved, on the motion of the Lord Provost, having regard to the report of the consulting engineer, to commend to the favourable consideration of the ratepayers of the city the Moorfoot scheme, submitted by Mr. Leslie, and to suggest that the matter be recommitted to the committee, with powers to prepare and issue a statement for the information of the public on the various schemes, to obtain, by means of voting papers or otherwise, the views of the citizens, to negotiate with the corporations of Leith and Portobello and the Water Trust, and, if the scheme is approved, to give the requisite parliamentary notices. It was also resolved to submit to the ratepayers whether power is to be taken in the proposed bill to settle the expenses incurred in reference to the St. Mary's Loch scheme, inclusive of £2000 incurred by the opponents of the bill.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

3077.—MARTIN, J. W., Liverpool, "An improved tube expander and stopper." Sept. 19, 1873.

3082.—SANDERSON, S., and PROCTOR, A., Huddersfield, "Improved means or apparatus for economizing the waste heat and gases from boilers and other furnaces, part thereof being useful as a water or liquid meter." Sept. 19, 1873.

3086.—FOTTRELL, J., Dublin, "An improved composition for the manufacture of pipes and tubes suitable for water at high pressure, and as conduits for sewage purposes, gas, &c." Sept. 20, 1873.

3101.—MEWBURN, J. C., Fleet Street, London, "Improvements in lighting railway carriages with gas, and in the apparatus employed therein." A communication. Sept. 22, 1873.

3119.—MICHEL, C., and FRAGER, A., Paris, "An improved water-meter or apparatus for measuring the flow of liquids." Sept. 23, 1873.

3127.—BLOTT, A. F., Bassingbourn, Cambridge, "An improved tap." Sept. 25, 1873.

3131.—BRADY, H., Bishopstoke, Hants, "An improved construction of apparatus for heating purposes." Sept. 25, 1873.

3138.—BEALE, J., East Greenwich, "An engine to be used for pumping gases, air, or fluids." Sept. 26, 1873.

3162.—FORBES, J., and HAMILTON, J., Handsworth, Birmingham, "An improved rotary engine and pump to be driven by water or steam power." Sept. 29, 1873.

3171.—BOAZ, W., Limehouse, "An improved instrument or apparatus for stopping or closing tubes or pipes." Sept. 30, 1873.

3173.—EVERETT, G. A., New York, "Improvements in pressure-gauges." Sept. 30, 1873.

3175.—FISCHER, J., Ulm, Wurtemburg, "An improved construction of meter for measuring water and other liquid bodies." Sept. 30, 1873.

3185.—VOIGT, F. G., Kentish Town, "Improvements in apparatus used in the production of gas from hydrocarbon liquids." Oct. 1, 1873.

3219.—HARROP, J., Manchester, "Improvements in taps or valves." Oct. 4, 1873.

3225.—WEST, J., Maidstone, "Improvements in apparatus used in the manufacture of gas." Oct. 4, 1873.

3227.—RITCHIE, C., Brixton, Surrey, "Improvements in apparatus for utilising heat for heating, cooking, ventilating, and lighting." Oct. 4, 1873.

3240.—CLARK, A. M., Chancery Lane, "An improved regulator for gas and other fluids." A communication. Oct. 6, 1873.

3243.—BLAKE, E. O., Leadenhall Street, London, "Improvements in apparatus for carburetting and supplying carburetted air for lighting and heating purposes." A communication. Oct. 6, 1873.

3264.—GARDNER, H., Holloway, Middlesex, "Improvements in treating air for the production of hydrocarbon gas, and in apparatus or appliances therefor." A communication. Oct. 8, 1873.

3269.—BLACKER, D., Thornhill Lees, near Wakefield, "Improved means or method of and apparatus for condensing and for attracting and absorbing the noxious gases arising from the combustion of coal gas used in connexion with blast-furnaces." Oct. 9, 1873.

GRANTS OF PROVISIONAL PROTECTION.

2936.—BOIS, L., Paris, "Improvements in the manufacture of lighting gas, and in apparatus employed therein." Sept. 6, 1873.

2954.—WILSON, A. F., Buckingham Street, Adelphi, "Improvements in apparatus used in the manufacture of gas, and in the production of some of its constituents." Sept. 8, 1873.

2974.—EDWARDS, D. O., Bayswater, Middlesex, "Improvements in means and apparatus for producing and radiating heat." Sept. 10, 1873.

3004.—WINN, C., Birmingham, "Improvements in gas-lamps." Sept. 12, 1873.

3005.—VALON, W. A. M'I., Gas-Works, Ramsgate, "Improvements in apparatus used in the manufacture of gas." Sept. 13, 1873.

3006.—TOZER, C. W., North Brixton, Surrey, "Improvements in water-waste preventers." Sept. 13, 1873.

3011.—RICHARDSON, G. W., New York, "Improvements in means or apparatus for ventilating and pumping purposes." Sept. 13, 1873.

3017.—WALKER, W., Manchester, "Improvements in apparatus for regulating and controlling the temperature of liquids and fluids." Sept. 15, 1873.

3077.—MARTIN, J. W., Liverpool, "An improved tube expander and stopper." Sept. 19, 1873.

3086.—FOTTRELL, J., Dublin, "An improved composition for the manufacture of pipes and tubes suitable for water at high pressure, and as conduits for sewage purposes, gas, and other liquors." Sept. 20, 1873.

3101.—MEWBURN, J. C., Fleet Street, London, "Improvements in lighting railway carriages with gas, and in apparatus employed therein." A communication. Sept. 22, 1873.

3119.—MICHEL, C., and FRAGER, A., Paris, "An improved water-meter or apparatus for measuring the flow of liquids." Sept. 23, 1873.

3127.—BLOTT, A. F., Bassingbourn, Cambridge, "An improved tap." Sept. 25, 1873.

3131.—BRADY, H., Bishopstoke, Hants, "An improved construction of apparatus for heating purposes." Sept. 25, 1873.

3158.—ROGERS, J. E., Smethwick, Stafford, "Improvements in the method of working the valves of steam pumping-engines." Sept. 27, 1873.

3162.—FORBES, J., and HAMILTON, J., Handsworth, near Birmingham, "An improved rotary engine and pump to be driven by water or steam power." Sept. 29, 1873.

3171.—BOAZ, W., Limehouse, Middlesex, "An improved instrument or apparatus for stopping or closing tubes or pipes." Sept. 30, 1873.

3175.—FISCHER, J., Ulm, Wurtemburg, "An improved construction of meter for measuring water and other liquid bodies." Sept. 30, 1873.

3185.—VOIGT, F. G., Kentish Town, Middlesex, "Improvements in apparatus used in the production of gas from hydrocarbon liquids." Oct. 1, 1873.

3188.—THOMPSON, N., Brooklyn, U.S.A., "Improvements in means for connecting together tubes and other hollow articles." Oct. 1, 1873.

NOTICES TO PROCEED.

1697.—HASELTINE, G., Southampton Buildings, London, "An improved method of and apparatus for lighting and extinguishing gas-burners." A communication. May 10, 1873.

1752.—POTEL, A. P., Brussels, "Improved joints for water, gas, steam, and other pipes." May 14, 1873.

1853.—ORSAT, L. H., Paris, "An improved apparatus for analyzing gas." May 22, 1873.

2021.—SHANKS, J., Barrhead, N.B., "Improvements in and connected with valves and waste-preventive apparatus." June 6, 1873.

2532.—WHITE, W., Hampstead, Middlesex, "Improvements in the treatment of sewage and cesspool water." July 24, 1873.

2784.—WILSON, A. F., Buckingham Street, Adelphi, "Improvements in apparatus for lighting and extinguishing public and other gas lamps or lights." Aug. 22, 1873.

2834.—MAITLAND, W. H., St. Swithin's Lane, London, "Improvements in the manufacture of gas, and in apparatus employed therein." A communication. Aug. 28, 1873.

2936.—BOIS, L., Paris, "Improvements in the manufacture of lighting gas, and in apparatus employed therein." Sept. 6, 1873.

2994.—CLARK, A. M., Chancery Lane, Middlesex, "Improvements in screw-valves." A communication. Sept. 11, 1873.

3005.—VALON, W. A. M'I., Ramsgate, "Improvements in apparatus used in the manufacture of gas." Sept. 13, 1873.

3011.—RICHARDSON, G. W., New York, "Improvements in means or apparatus for ventilating and pumping purposes." Sept. 13, 1873.

3017.—WALKER, W., Manchester, "Improvements in apparatus for regulating and controlling the temperature of liquids and fluids." Sept. 13, 1873.

3101.—MEWBURN, J. C., Fleet Street, London, "Improvements in lighting railway carriages with gas, and in the apparatus employed therein." A communication. Sept. 22, 1873.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

1131.—LANDAU, M. I., St. Mary Axe, London, "Improvements in lamps and apparatus for lighting, also in stoves or apparatus for heating, and in instruments for kindling lights, part of the improvements being applicable for ventilating." March 26, 1873.

1251.—HARPER, J. R., Clerkenwell, "Improvements in gas-lamp blow-pipe apparatus." April 4, 1873.

1276.—HEY, J. G., Hartshead Moor, Cleckheaton, and STODEN, R., Brighouse, "Improved means or apparatus for treating and utilizing gas tar for heating purposes." April 7, 1873.

1487.—SKELTON, T. A., Essex Street, Strand, "Improvements in street-lanterns to facilitate lighting." April 24, 1873.

2307.—GILES, B., Blackheath, Kent, "An improved apparatus for heating water." July 3, 1873.

2339.—GRICE, R. W., Aix-la-Chapelle, "Improvements in the manufacture of gas and coke, and in apparatus connected therewith." July 5, 1873.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2517.—HARRIS, H., "Improvements in filtering, and in apparatus for the purpose." Sept. 19, 1870.

2529.—COUPER, J., and RICHARDSON, W. H., "Improvements in lamps." Sept. 20, 1870.

2543.—DAFT, T. B., and CRAWLEY, C. E., "Improvements in the construction of tubes." Sept. 22, 1870.

2591.—SYMES, G., "Improvements in portable apparatus for manufacturing gas." Sept. 29, 1870.

2633.—HASELTINE, G., "Improvements in pumps." Oct. 4, 1870.

LIVERPOOL WATER SUPPLY.—An important new project has just been broached for giving an increased supply of water to Liverpool from Windermere Lake. It is scarcely 20 years ago that extensive new works for the supply of water to the town were constructed at Rivington, about 20 miles from Liverpool, under the superintendence of Mr. Hawksley, C.E., who designed the works. The water at these works is supplied in large quantities from the surrounding Rivington Hills, and impounded in immense reservoirs, which, from their large dimensions, have been styled the Rivington Lakes. At the time these works were constructed it was believed that, with the existing well supply, they would be sufficient to furnish the inhabitants with water for an almost indefinite period; but it now appears that in consequence of the great expansion of the district, and the increase of the population, they are inadequate to the required supply; and at a recent meeting of the Water Committee of the corporation (to whom the works belong) the chairman stated that, taking into consideration the constantly increasing population, it was calculated that an additional 4 million gallons per day would shortly be required, which the existing works could not possibly supply, and that new sources must therefore be looked to. He added that Windermere Lake was looked upon as the best locality to which the corporation could go; and he described the proposal for constructing new works there. The heaviest portion of the proposed works would be a tunnel, commencing at the edge of the lake on the south side. This tunnel would be three miles in length, and, although a heavy piece of work, would be the only engineering feature of any great consequence in the undertaking. From the lake to Lancaster, a distance of about 25 miles, the water would be conveyed by natural gravitation, the level at Windermere being much higher than the line of country between that point and Lancaster. Commencing at Lancaster, there would be several pumping-stations between that town and Liverpool. The first pumping-station would be at Lancaster, where the water would be pumped to Preston. At Preston there would be another pumping-station, the water being again pumped from that town, and also from other pumping-stations, in the direction of Liverpool until it reached that locality. There would be several reservoirs on the route between Windermere and Liverpool. The cost of pumping the water from Windermere and along the several intermediate points to Liverpool is estimated at 2d. per 1000 gallons. The distance between Windermere Lake and Liverpool is about 80 miles. The ultimate decision of the corporation as to the proposed undertaking is not yet known. What, however, seems to be admitted as a certainty is the fact that the existing works are unequal to the water supply required, and that new sources in some direction must be secured.—*The Builder.*

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The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

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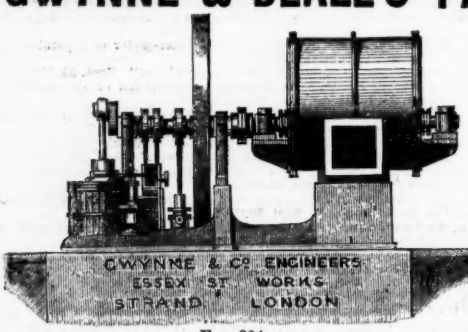

FIG. 224.

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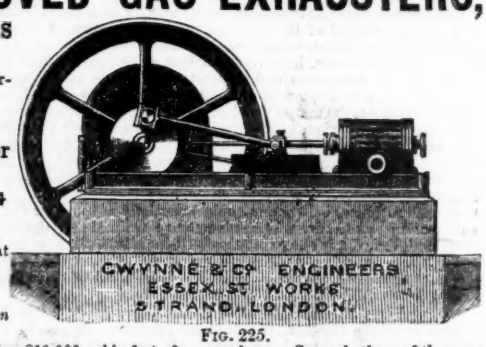


FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,

CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.

DUKE OF HAMILTON'S

LESMAHAGOW GAS COAL.

The superior quality of this well-known Cannel, as wrought by

THE NITSHILL AND LESMAHAGOW COAL COMPANY,

Is now generally admitted by all Gas Engineers.

PRICE AND ANALYSIS MAY BE HAD ON APPLICATION TO

JAMES M'KELVIE, HAYMARKET, EDINBURGH.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

TO GAS COMPANIES.

GEORGE M'KAIG,

MANUFACTURER OF

GAS-PURIFYING WOOD SIEVES,

153, CLEVELAND STREET,

DONCASTER.

It requires but one trial to prove the Superior Make, Strength, and Durability of these Sieves.

FIRE-CLAY RETORTS.

WILLIAM FRASER,

INVERKEITHING,

(Owner of the Works at which Fire-Clay Retorts were first made), can supply

RETORTS, FIRE-BRICKS, &c.,

to any extent.

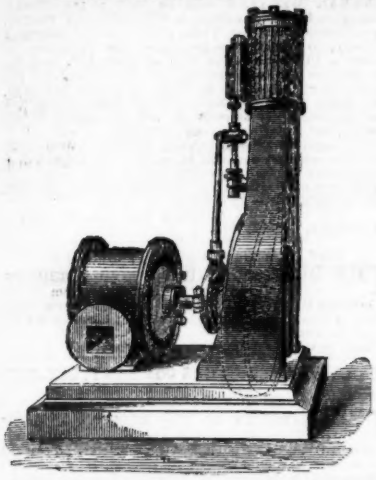
References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his

CELEBRATED HALBEATH STEAM COALS,

on Navy List.

BEALE'S IMPROVED PATENT GAS-EXHAUSTER

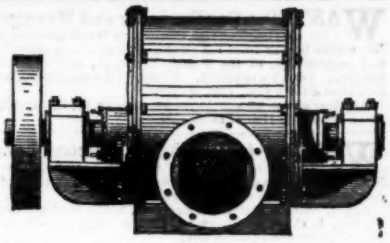


WITH

ENGINE COMBINED

ON

ONE BASE PLATE.



SOLE MAKERS,

GEORGE WALLER & CO.,

Who, since Mr. BEALE'S retirement, are the Oldest Makers.

EXHAUSTERS with HORIZONTAL ENGINE combined.
EXHAUSTERS with OUTSIDE BEARINGS.
MAKERS of ENGINES, BOILERS, and GAS MACHINERY.
TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever.
MANN'S and many other descriptions of WATER DISTRIBUTORS,
SCRUBBERS, PURIFIERS, and CONDENSERS.
EXHAUSTERS from 3000 to 60,000, new and second hand, in stock.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, S.E., & at STROUD, GLOUCESTERSHIRE.

WHITEHOUSE AND COMPANY, LIMITED,

GLOBE TUBE-WORKS, WEDNESBURY; & VICTORIA TUBE-WORKS, GREAT BRIDGE, STAFFORDSHIRE,

MANUFACTURERS OF

PATENT WELDED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

GAS-FITTERS TOOLS, STEAM COCKS, AND ALL KINDS OF JOINTS.
HYDRAULIC TUBES, CORE BARS, TELEGRAPH POSTS, COILS, &c.

London Agent—ALFRED LAKEMAN, 18, IRONMONGER LANE, CHEAPSIDE, E.C.

HODGE & CO.'S

IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES
TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

GAS ENGINEERS,

100, HATTON GARDEN, LONDON.

Drawings and Prices upon application.

THE STEAM STOKER COMPANY, LIMITED,

ARE NOW PREPARED TO GRANT

LICENCES FOR THE USE OF THEIR VARIOUS PATENTS

FOR

STOKING BY MACHINERY.

Under one or the other of their Patents, Machines can be adapted to almost any existing works without material alteration of the Retort-Houses or Settings.

Applications, accompanied by full particulars as to dimensions of the Retort-Houses, Settings of the Retorts, &c., &c., should be addressed to the Secretary, at the Offices of the Company,

155, FENCHURCH STREET, LONDON, E.C.

GAS PURIFICATION.

JOHN WM. O'NEILL AND CO.,

CONTRACTORS FOR

GAS PURIFICATION BY OXIDE OF IRON,

39, LOMBARD STREET, LONDON, E.C.

WANTED, Three Good Pattern Makers.
Constant work for steady hands.
Apply to H. SKOINES, 7, Argyle Street, King's Cross, W.C.

WANTED, a Gas Engineer and Manager
for the Ottoman Gas Company's Works at Smyrna. Requisites for the office: A good knowledge of gas-making and engineering, of the French language, and of book-keeping. Security required. Salary, with commission, not less than £450 a year, with residence.
Applications to be sent to the SECRETARY, 85, CHEAPSIDE, on or before the 11th of December.

WANTED to Purchase, a second-hand
wrought or cast iron TAR TANK, to hold about 1000 gallons; also a second-hand SCRUBBER, 5 or 6 inch connexions. Both must be in good condition.
Apply, stating price, carriage free, to the Sittingbourne Station, L. C. & D. Railway, to the MANAGER, Gas-Works, MILTON-NEXT-SITTINGBOURNE.

TO GAS COMPANIES AND OTHERS.

WANTED, an appointment as Manager
of Gas-Works, or as SECRETARY and MANAGER. The advertiser is thoroughly acquainted with the practical working and construction of Gas-Works, &c. First-class references and testimonials.
Address X. Y. Z., 68, Park Walk, CHELSEA, S.W.

WANTED immediately, a steady, active
man as WORKING MANAGER of a small Gas-Work near Exeter.
Address, with references, stating age, to ROBERT FISH AND CO., Gas Engineers, 6, Clifton Road, EXETER.
Oct. 16, 1873.

WANTED, by a practical man, a situa-
tion as MANAGER or FOREMAN of a Gas-Work. Thoroughly understands the manufacture, distribution, and testing of gas, also the setting of retorts with the introduction of hot air. Good references and testimonials as to character and abilities.
Address G. L., 52, New Weston Street, Long Lane, Bermondsey, S.E.

GAS-FITTERS.

WANTED immediately, an experienced
GAS-FITTER and SERVICE-LAYER. Must understand and be able to repair wet and dry gas-meters; also taking indices and watering meters. Strict sobriety indispensable.
Applications, in own handwriting, stating age, wages required, and references, to be sent to WM. B. EMMERSON, Engineer, Corporation Gas-Works, DARLINGTON.

TO GAS COMPANIES.

WANTED, by the Advertiser, a re-
engagement as MANAGER of a medium-sized Gas-Works. Thoroughly conversant with the manufacture and distribution of gas. Has been at present employment nine years. First-class references. Is used to the photometer and testing.
Address J. G. S., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a re-engagement by a young
man, aged 27, who has for some years had the Management of a Gas-Work under an eminent and well-known firm of gas engineers. Would have no objection to a temporary engagement to superintend the erection or enlargement of a Gas-Work, or a permanent engagement as Manager. Excellent references as to character, ability, &c.
Address ALPHA, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS MANAGERS.

WANTED, at the New Gas-Works,
Tickhill, Yorkshire, a clever practical MAN who thoroughly understands the business of gas-making.
The Directors would not object to lease the plant at a per centage, should any one prefer taking it into his own hands to work and make the most of.
There is an excellent new dwelling-house attached, and a large piece of ground for garden purposes.
For particulars, apply to Mr. WM. POPPLEWELL, Solicitor to the Company.

WANTED, by a practical Working
Manager, of 20 years experience, a situation as MANAGER of Gas-Work making from 15 to 20 million per year. Is well acquainted with every branch in and out of the works. Well up in the setting and working of both clay and iron retorts, also engine and exhauster. Can make any alterations, or carry out any extensions. Five years in present situation. Desire for wishing to change is to improve position. Aged 40.
Address S. J., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MR. HEDLEY, C.E., may be Consulted
upon all matters connected with Gas, Water, and Sanitary Improvements. He is specially prepared to undertake Parliamentary, Legal, and Rating Cases, and to act as Arbitrator or Referee.
Mr. HEDLEY has devoted great attention to the vexed question of the Supply of Gas to Street Lamps, and refers to his Evidence given before Parliament upon the Birmingham, Nottingham, Metropolis, City of London, Luton, and other Gas Bills.
3, ABCHURCH LANE, LOMBARD STREET, LONDON, E.C.

COOKING AND HEATING BY GAS,
BY
MAGNUS OHREN, A.I.C.E.

GAS *versus* COAL.

Pamphlet for Gas Companies to circulate amongst their gas consumers to increase day consumption, &c.
£1 per 100; £3 15s. per 500; or £6 per 1000.
Address, MAGNUS OHREN, Gas-Works Lower Sydenham, London, S.E.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBU-
TION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.
South Shields, January, 1873. W. J. WARNER.

FOREMAN of Main and Service Pipe
Layers wanted. Liberal wages to a competent man.
State experience, wages required, and send testimonials (copies only) to SAMUEL HUNTER, Engineer, Gas-Works, ROCHDALE.
Oct. 16, 1873.

TENDERS WANTED from Manufac-
turers for GASHOLDERS, to contain from 280 to 15,000 cubic feet, together with castings for retorts of various sizes, purifiers, condensers, &c.
Tenders to be sent in closed envelopes, addressed to the SECRETARY, Gas Consumers Apparatus Company, Limited, 85, GRACECHURCH STREET, E.C.

EXHAUSTERS AND ENGINES.

ON SALE, at the Rochdale Gas-Works,
one 10,000 cubic feet per hour EXHAUSTER, and two 35,000 feet per hour, with engines.
For further particulars apply to SAML. HUNTER, Engineer. Gas-Works, Rochdale, Oct. 16, 1873.

FOR SALE—A small Gas-Work in good
condition, including 4 8-ft. iron retorts, gasholder 12 ft. by 8 ft., purifier, condenser, and connexions.
Apply to Mr. WATMORE, Gas-Works, MAIDENHEAD.

FOR SALE—A Sulphate Ammonia
CHAMBER and DRAINER (made by Nelson, of Bolton). As good as new.
May be seen, and particulars obtained, on application to the undersigned.
Gas-Works, Lancaster. WM. FLEMING.

THE Directors of the Rochester, Chat-
ham, and Strood Gaslight Company are prepared to receive TENDERS for the purchase of their surplus TAR and AMMONIACAL LIQUOR for the year 1874 (1st of January to the 31st of December). The Tar and Liquor can be delivered into tank barges at the works, at Rochester, and at Gillingham, on the Medway.
Tenders may be for the Tar and Liquor separately or together.
Further particulars may be known by application to the Secretary, at the Office, 56, High Street, Rochester.
Tenders must be at the Office, as above, not later than noon of Thursday, the 30th of October inst.
The Directors reserve the right to reject any or the whole of the tenders. By order,
Rochester, Oct. 6, 1873. WILLIAM SYMS, Secretary.

THE Scarborough Gas Company, owing
to the removal of their works, will have FOR SALE, about October, 1874, the following APPARATUS, the whole of which is in exceedingly good condition:—
Fittings for 140 Retorts, consisting of mouthpieces, ascension, saddle, and dip pipes, and hydraulic and foul mains.
A Condenser, consisting of 40 12-in. pipes, with top and bottom boxes, and inlet, outlet, and bye-pass valves.
Two Scrubbers, each 7 ft. diameter and 16 ft. high, with valves as before.
Two Purifiers, 8 ft. 6 in. square and 5 ft. deep, 20-in. water lutes.
Two Cast-iron Water-Tanks, respectively 24 ft. by 16 ft. by 4 ft., and 20 ft. by 8 ft. by 4 ft. New in 1865.
Two Horizontal Engines, 4 h. p., two single-flue Cornish boilers, and two 20,000 feet per hour Beale's Exhausters. All new in 1866.
One Station-Meter, by Milne, 20,000 feet per hour. New in 1864.
One Gasholder 80 ft. diameter, in two 24-ft. lifts. About 11 years old.
One Gasholder 50 ft. diameter, in two 22-ft. lifts. Only 4 years old.
Two Governors, by Parkinson, on 12-in. and 10-in. mains.
A considerable length of 10-in. Cast-iron Socket and other Pipes.
An inspection of the above Apparatus is requested by the Officers of Companies requiring enlargements or extensions, and offers to purchase will be duly considered.
By order of the Board,
JAMES MOON,
Manager and Secretary to the Company.

TOTTENHAM & EDMONTON GAS-
LIGHT and COKE COMPANY.
NOTICE is hereby given that the ANNUAL ORDINARY GENERAL MEETING will be held at the Works, Willoughby Lane, Tottenham, on WEDNESDAY, the 29th day of October inst., at Three o'clock in the afternoon precisely, to receive the Report of the Directors, to declare a Dividend to the 30th of June last, and for the Election of Two Directors and an Auditor for the ensuing year (Colonel A. A. Croll and James Brickwell, Esq., being the Directors, and Hugh Hercus, Esq., the Auditor), who retire by rotation, and are eligible for re-election, and offer themselves accordingly.
The accounts for the year ending the 30th of June, 1873, have been audited, and will be open to the inspection of Shareholders fourteen days prior to date of meeting.
The Transfer Books will be closed on Tuesday, the 14th, until the 30th inst.—By order of the Board,
JAMES RANDALL, Secretary.
Edmonton, Oct. 13, 1873.

THE NEW GAS COMPANY, LIMITED.

THE Directors of the above Company
are ready to receive APPLICATIONS from owners of existing Gas-Works, as well as from others erecting or about to erect new works, and to grant Licences for the use of the Patents.
Apply to the SECRETARY, 22, WALBROOK, E.C.

SEAHAM HARBOUR GAS COMPANY, LIMITED.

TO CONTRACTORS, &c.

THE Directors of the above Company
invite TENDERS for the construction of a BRICK GASHOLDER-TANK, 80 feet in diameter. Plan and specification at the Company's Offices.
Tenders to be delivered not later than Tuesday, Nov. 4.
Oct. 20, 1873.

BOROUGH OF BARROW-IN-FURNESS.
GAS AND WATER DEPARTMENT.
CONTRACT FOR GAS COALS, &c.

THE Gas and Water Committee invite
TENDERS for the supply of about 6000 tons of CANNEL and GAS COAL, to be delivered at their works, in such quantities and at such stated periods as may be required during the six months ending June 30, or twelve months ending Dec. 31, 1874.
The contract will be subject to an arrangement as to variation in colliers wages.

RESIDUAL PRODUCTS.

TENDERS are also invited for the sur-
plus RESIDUAL PRODUCTS at their works, for One or more years, commencing the 1st of January next, comprising Gas Tar and Ammoniacal Liquor.
The quantity of each will be about 60,000 gallons per annum.
Particulars may be obtained on application to Mr. J. Lewis, Manager.
Sealed tenders, addressed, "The Chairman of the Gas and Water Committee," and endorsed, to be sent in to me not later than Oct. 24, 1873.
C. F. PRESTON, Town-Clerk.
Municipal Offices, Oct. 3, 1873.

In the press, and will shortly be published,

THE GAS CONSUMER'S MANUAL;
OR,
How to obtain Good Light and Cheap Gas.

Being a Popular Exposition of the Chemistry of Gas Lighting, with Practical Instructions in the best methods of burning Gas for Lighting, Cooking, and Heating; and Suggestions as to the proper Sizes of Interior Pipes, Arrangement of Lights, &c., &c.
ILLUSTRATED.

ALSO,

ON SETTING AND WORKING RETORTS.

A Revised and Illustrated Reprint of a Paper read at the Annual Meeting of the British Association of Gas Managers in 1870.
By E. S. CATHELS, Assoc. Inst. C.E., Montreal, Canada.

AN ANALYSIS
OF THE
METROPOLITAN GAS COMPANIES ACCOUNTS
For 1872.
COMPILED AND ARRANGED BY JOHN FIELD,
Chief Accountant to the Imperial Gas Company.
Price 10s. 6d.
Can be obtained from the AUTHOR, at 26, Arundel Square, Islington, N., per post; of EDEN FISHER, Stationer, 50, Lombard Street, E.C.; or of
WILLIAM B. KING, Office of the JOURNAL OF GAS LIGHTING,
11, BOLT COURT, FLEET STREET, E.C.

G. J. EVESON,
GAS COAL MERCHANT,
STOURBRIDGE.
Delivery per Rail to any Part.

SAMUEL PONTIFEX, Consulting Gas Engineer, having retired from the Great Central Gas Company, is now prepared to furnish PLANS and SPECIFICATIONS, as well as ADVISE Provincial Gas Companies as to the erection of new, or alteration and enlargement of existing works.
Offices: 22, Coleman Street, LONDON, E.C.

REMOVAL.

MR. ALFRED PENNY, C.E., begs to give notice that he has REMOVED his Offices from the Wenlock Iron-Works to No. 20, ABINGDON STREET, WESTMINSTER, where he may be consulted as usual on all matters connected with Gas-Works, Water-Works, and Drainage, both for England and Abroad.

MR. WILLIAM DORE (19 years Gas Engineer and Accountant) may be CONSULTED upon all matters relating to the manufacture and distribution of gas, and the management, accounts, or transfer of gas undertakings.
Office, 4, Picton Place, Neath, SOUTH WALES.

THE "TAMAR" FIRE-BRICK AND CLAY COMPANY, LIMITED, invite attention to their FIRE-BRICKS, which are now in use by a number of the leading firms of Lime and Cement Manufacturers, Gas Companies, &c., &c., and are pronounced equal to the best Stourbridge.
For particulars and prices, apply to the SECRETARY, 5, Great Winchester Street Buildings, LONDON, E.C.
Sept. 24, 1873.

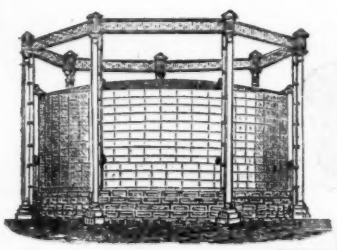
MR. NORWOOD EARLE, late of the Dover Gas-Works, is prepared, after 17 years experience, to undertake the duties of SURVEYOR to Gas Companies and Corporations in all matters relating to the Distribution of Gas and Gas Testing. Contracts entered into for the Survey of Mains, Services, Public Lamps, &c., in order to reduce the per centage of unaccounted-for gas to the lowest possible amount.
Valuations for Assessment, Transfer, and other purposes.
Offices, MANSION HOUSE CHAMBERS, 12, Queen Victoria Street, LONDON, E.C.

Mr. ALFRED LASS,
60, CORNHILL, LONDON, E.C.,
Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.
To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.
To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for
good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE.

ALFRED WILLIAMS,
PHŒNIX FIRE-BRICK WHARF,
64, BANKSIDE, SOUTHWARK, LONDON, S.E.
GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

SAM. CUTLER & SONS,
CONTRACTING GAS ENGINEERS,
GASHOLDER & GENERAL GAS APPARATUS MAKERS,
MANUFACTURERS OF
BOILERS, IRON ROOFING, IRON BRIDGES,
AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.
Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers,** and **Purifiers,** of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**
WORKS FOR THE SUPPLY OF
VILLAGES, MANSIONS, FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water,** and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.
SOLE MAKERS OF BRETT'S PATENT COKE BARROW.
Experienced Retort Setters sent to any part of the Kingdom.
Address: PROVIDENCE IRON-WORKS, MILLWALL, LONDON.

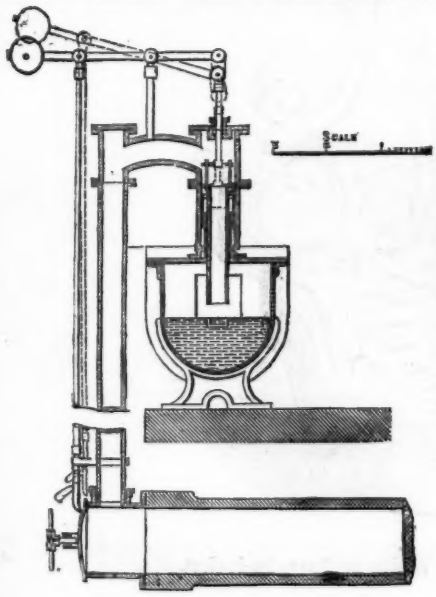
ALBERT GAS COAL.
THE DERBYSHIRE
SILKSTONE COAL COMPANY,
LIMITED,
CAN OFFER A
GAS COAL
Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	10·375
Weight of coke in lbs. per ton of coal	1462

Analysis and Prices on application to
MR. EDMUND TAYLOR,
SECRETARY,
ALBERT COLLIERY, NEWBOLD,
near CHESTERFIELD.

GAS COMPANIES
AND
LOCAL BOARDS
Requiring New Street-Lamps
are recommended
KEEN'S PATENT
DOUBLE-CLIP
STREET-LAMP.
A great improvement on the old-fashioned 14-in. Lamps.
They have been sold to various Gas-Works throughout the country and abroad, and the highest satisfactory testimonials are given as to their superiority.
For particulars of price, &c., apply to
WILLIAM KEEN, Sole Proprietor and Manufacturer, Robertson Street, HASTINGS.

CHANDLER'S PATENT DIP-PIPE.



It is well known by all Gas Managers that back pressure upon the retorts greatly retards the production of gas, causing a deposit of carbon which keeps steadily accumulating. Such carbon reduces the capacity of the retorts, requires extra fuel for heating, and has to be frequently removed by heavy iron bars, which very much injure the retorts. By the use of Chandler's Patent Dip all these evils are entirely remedied. When the retorts are being drawn and charged, the Dip-Pipe is sealed in the fluid of the hydraulic main. As soon as the lids are replaced, the Dip is raised completely out of the fluid, and the gas passes unrestricted to the holders. By running the exhauster to a level gauge, ALL PRESSURE IS REMOVED FROM THE RETORTS. The consequence is that there is no deposit of carbon, no need of scurfing, no extra fuel is required, a large saving of wear and tear and loss of time is effected, and a greatly increased production of gas per ton of coal is realized.

The following testimonial letter has been received from the manager of the Erith Gas-Works:—

Messrs. Chandler and Sons.
Gentlemen,—I beg to inform you that during last week I carbonized 18 tons 5 cwt. of Ravensworth Pelaw Coal in a single setting of retorts fitted with your Patent Dip-Pipes, and obtained a yield of 195,800 feet of gas, equal to 10,780 feet per ton, which is a considerably greater yield than I have been able to obtain before using your Dip. The single retort fitted with your Patent Dip, which has now been in use here upwards of four months, has been throughout, and is now, quite free from carbon.
I am, gentlemen, &c.,
Erith Gas-Works, Aug. 2, 1873. (Signed) D. VINCENT, Manager.

For terms of use and cost, apply only to the Patentees,
Messrs. CHANDLER & SONS, ENGINEERS AND CONTRACTORS,
YORK-STREET, LONDON ROAD, SOUTHWARK, LONDON, S.E.

JOHN WRIGHT & CO.

ESSEX WORKS, BIRMINGHAM,

GAS-STOVE MANUFACTURERS TO THE TRADE,

Have pleasure in submitting their NEW DESIGNS of

REFLECTOR GAS-STOVES

FOR THE SEASON.

They respectfully remind Managers of Gas-Works that it has been found that by the introduction of Gas for Heating and Cooking, not only are the inhabitants of the town greatly convenienced, but that the Works are made profitable by day as well as by night.

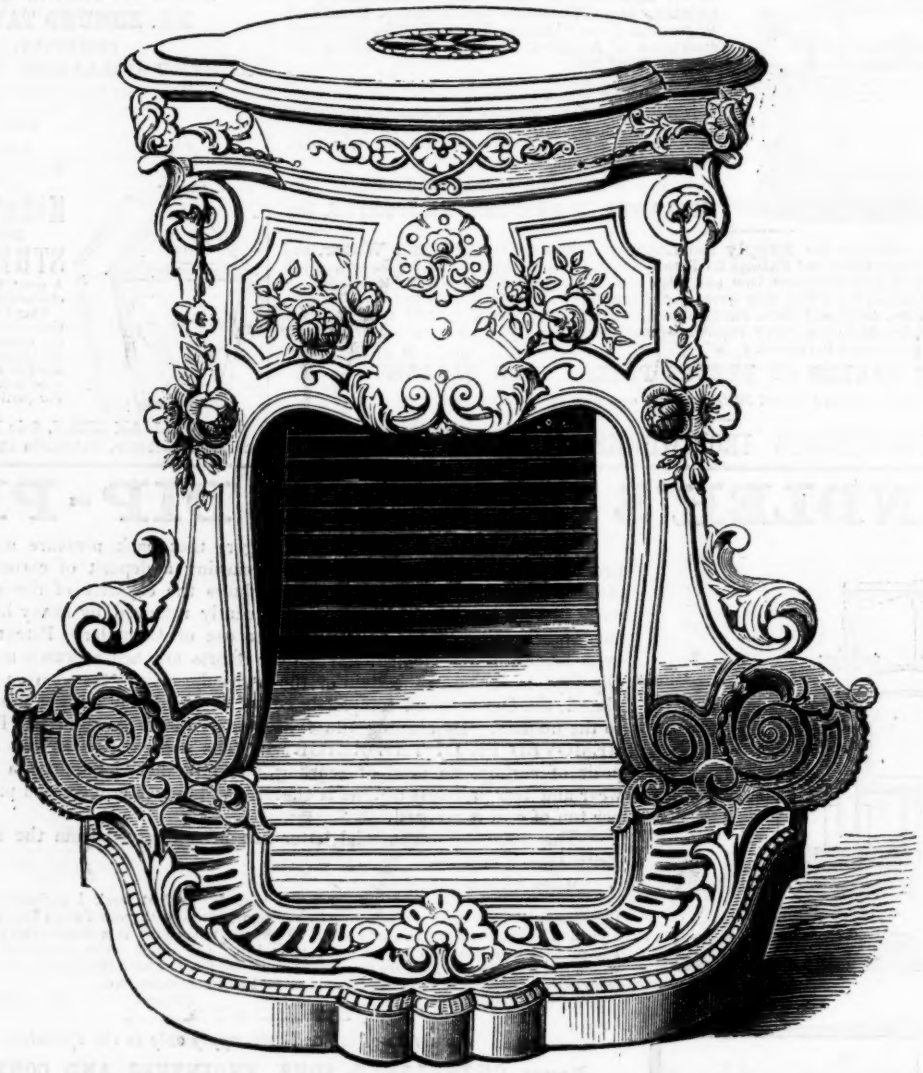
JOHN WRIGHT & CO. will be pleased to send their illustrated book of Stoves for Heating and Cooking by Gas, free on application, and also their prices to the Trade, which will be found lower than any other Maker.

The merit of these Patent Gas-heating Stoves consists in the simple arrangement for producing a powerful reflected heat with a small consumption of Gas, at the same time being totally free from smoky or unpleasant smells, and having the appearance and effect as from a clear and brilliant open coal fire.

The outer case of the Stove consists of Ornamental Cast Iron, within which is fixed a curved, powerful, polished metal reflector, of copper; above the reflector, and concealed by the ornamental casting, is an iron pipe with a few small gas-jets, which, burning horizontally beneath an iron radiating plate, deflects the heat to the polished reflector below, from which it is diffused into the apartment. Above the radiating plate is a chamber for storing the heat; into this there is a continuous stream of fresh air from the back of the Stove, which passes warmed through the perforated top into the apartment.

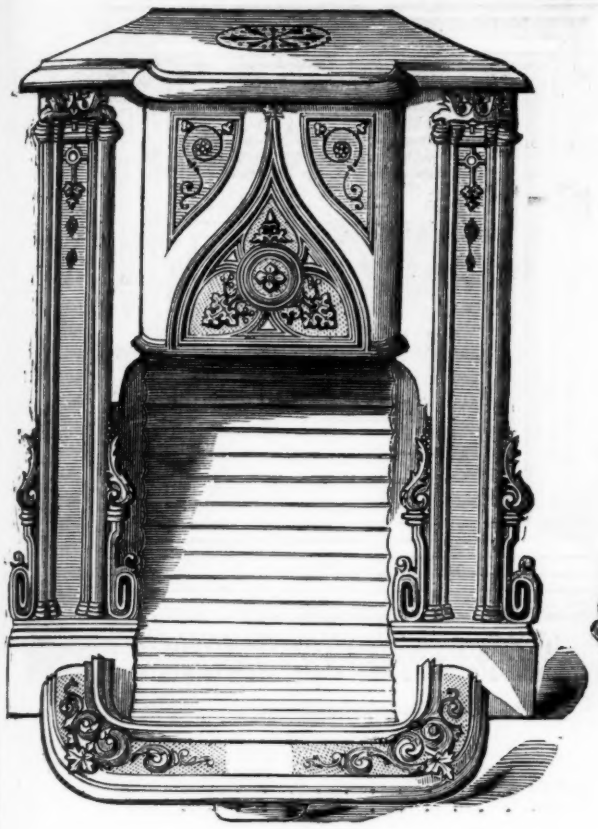
It will be found by a little experience that after the Stove has become heated the quantity of Gas necessary to keep it in full force may be reduced.

All these Stoves have Copper Reflectors, except No. 4050, *which is all Brass.*



No. 4025.—Height, 33 inches; Width at Top, 28 inches; Width at Base, 36 inches.

JOHN WRIGHT & CO.,



No. 4022.

Height	24 inches.
Width at Top	19 „
„ at Base	21 „

No. 4024.

Height	21 inches.
Width at Top	15 „
„ at Base	19 „

No. 4014.

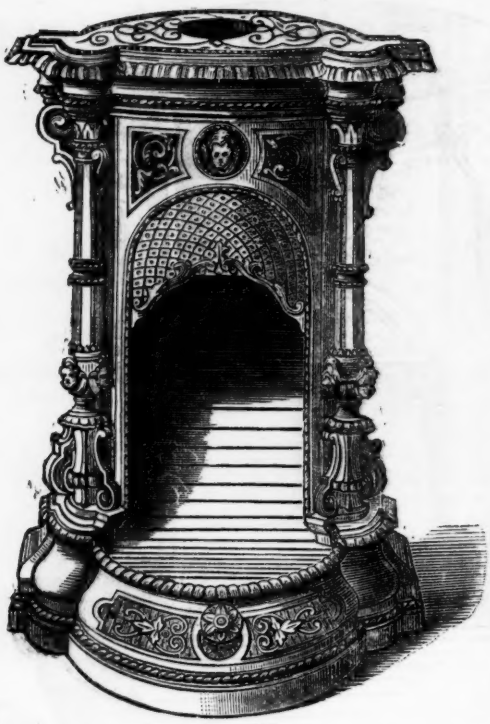
Height	34 inches.
Width at Top	20½ „
„ at Base	32 „

No. 4036.

Height	29 inches.
Width at Top	23 „
„ at Base	28 „

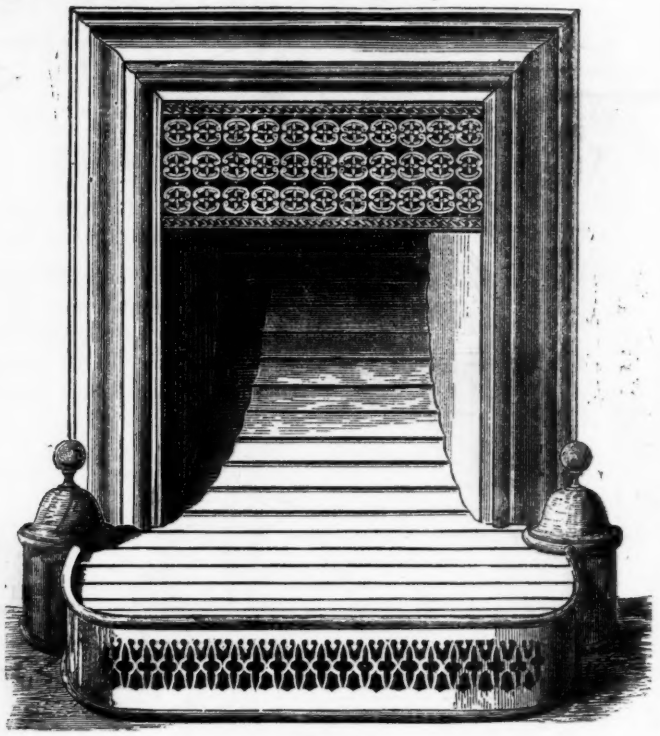
ESSEX WORKS, BIRMINGHAM.

JOHN WRIGHT & CO.,



No. 4011.

Height	27½ inches.
Width at Top	17½ „
„ at Base	19½ „

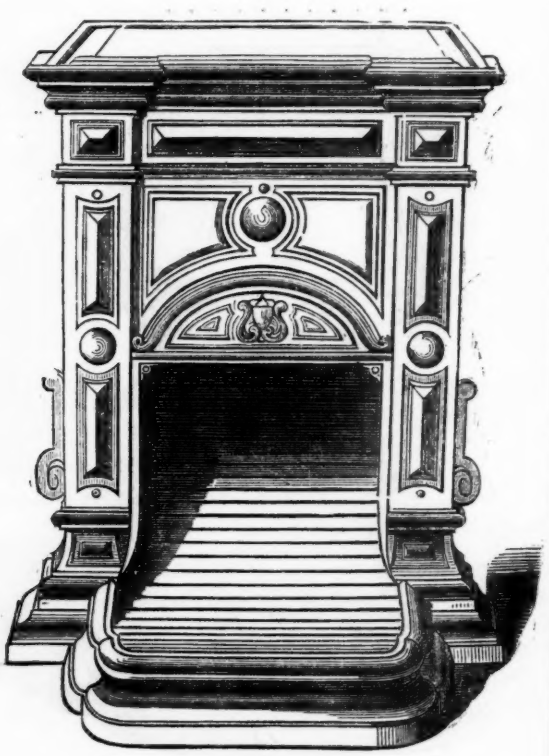


No. 4050.
Brass interior of Stove, with Brass Reflector.

Height	20 inches.
Width	18 „

No. 4029.

Height	31 inches.
Width at Top	14½ „
„ at Base	17⅓ „

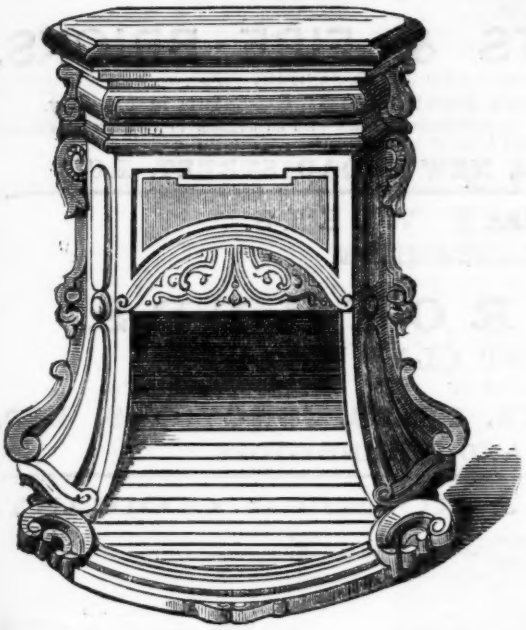


No. 4039.

Height	31 inches.
Width at Top	23 „
„ at Base	25½ „

ESSEX WORKS, BIRMINGHAM.

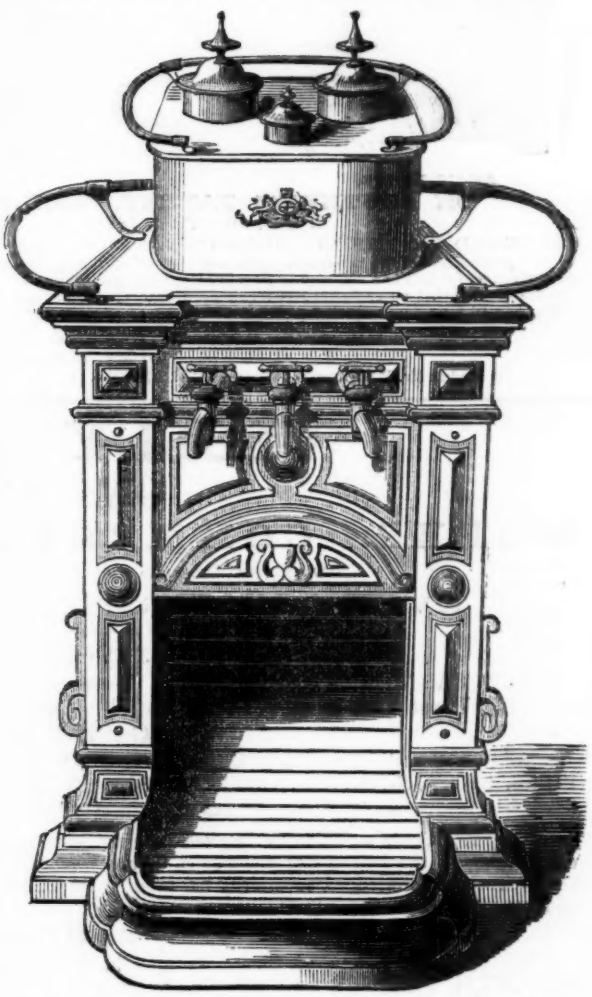
JOHN WRIGHT & CO.,



No. 4018.
Height, 26 in.; width at Top, 19 in.; width at Base, 26 in.

No. 4044.
Height, 25 in.; width at Top, 15 in.; width at Base, 20½ in.

No. 4003.
Height, 22 in.; width at Top, 15 in.; width at Base, 19 in.



No. 4039 B.—Height of Stove, without Muller, 31 in.; width at Top, 23 in.; width at Base, 25½ ins.

No. 4020.—Height, 15 in.; width, 15 in.; depth, 11 in.

ESSEX WORKS, BIRMINGHAM.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,

Of every size and shape, and of the best quality; also of White and Coloured GLAZED BRICKS, SANITARY PIPES, &c., &c.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Gas-Retorts in Fire-Clay.

In order to meet the constantly increasing demand for their Gas-Retorts, the F. I. Co. have recently made such an addition to their premises as will enable them to execute expeditiously the largest home or foreign orders.

Apply as above, or to the London Offices, 15, NEW BROAD STREET, E.C.

LIVESEY FIRE-CLAY WORKS.

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS

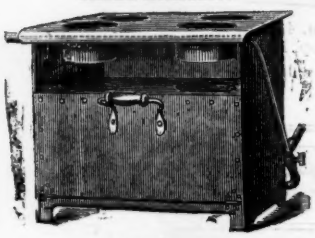
AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

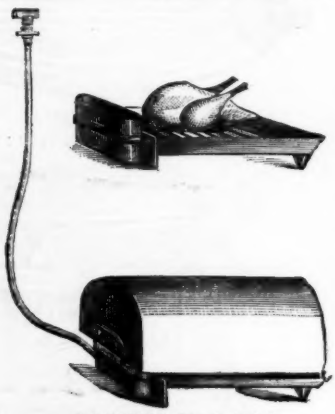
THE ECONOMIC GAS-RANGE & ROASTER COMPANY,

TABLE ROASTER.



SMALL RANGE.

LARGE RANGE.



ROASTERS, Nos. 1, 2, & 3.

ON SOUTHBY'S PATENT, WHICH SECURES PERFECT VENTILATION.

A 7-lb. JOINT ROASTED TO PERFECTION FOR ONE HALFPENNY.

SELECTED BY THE COMMISSIONERS FOR THE ANNUAL INTERNATIONAL EXHIBITIONS, 1871 & 1873.

A pennyworth of gas, perfectly consumed and economized as it is under this Patent, does as much work as six pennyworth of coal. The peculiar arrangement of cannel fishtails in a chimney secures freedom from smoke even with the richest gas, and a positive immunity from every trace of smell. The simplicity in use is so great that no experience is required. Roasters from 10s. 6d. to £1 5s. Complete Ranges at £2 for small families; £3 10s. for ordinary establishments; and £6 for a Range equal in power to a large Kitchener. Estimates given for fitting up Hotels, Restaurants, and large Establishments.

Works: 2, BASSETT STREET, MALDON ROAD, KENTISH TOWN, N.W.,

Where the Apparatus can be seen in operation;

And at Mr. WOODCOCK'S Offices, 23, ABINGDON STREET, WESTMINSTER, where Mr. SOUTHBY can be consulted by appointment.

WILLEY AND FORD,

GAS ENGINEERS,

WORKS: COMMERCIAL ROAD, EXETER,

INVITE THE ATTENTION OF GAS COMPANIES AND OTHERS FOR THE SUPPLY OF

EVERY DESCRIPTION OF GAS APPARATUS.

ENGINEERING DEPARTMENT.

NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

GASHOLDERS AND TANKS.

RETORTS and RETORT-HOUSE FITTINGS, CONDENSERS, SCRUBBERS, ENGINES and EXHAUSTERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, &c.

METER DEPARTMENT.

They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

GAS-FITTING DEPARTMENT.

An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS, MEDIÆVAL FITTINGS for CHURCHES, &c.

PATTERN-BOOKS and PRICE LISTS furnished.

☞ PLEASE NOTE THE ADDRESS—

GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER.

WILLIAM & BENJAMIN COWAN,

ESTABLISHED 1827,

KING HENRY'S WALK,
BALLS POND ROAD,
(NEAR DALSTON JUNCTION STATION,) **LONDON, N.**

BUCCLEUCH ST. WORKS,
EDINBURGH.

Manufacturers of DRY GAS-METERS in TIN AND CAST-IRON CASES.

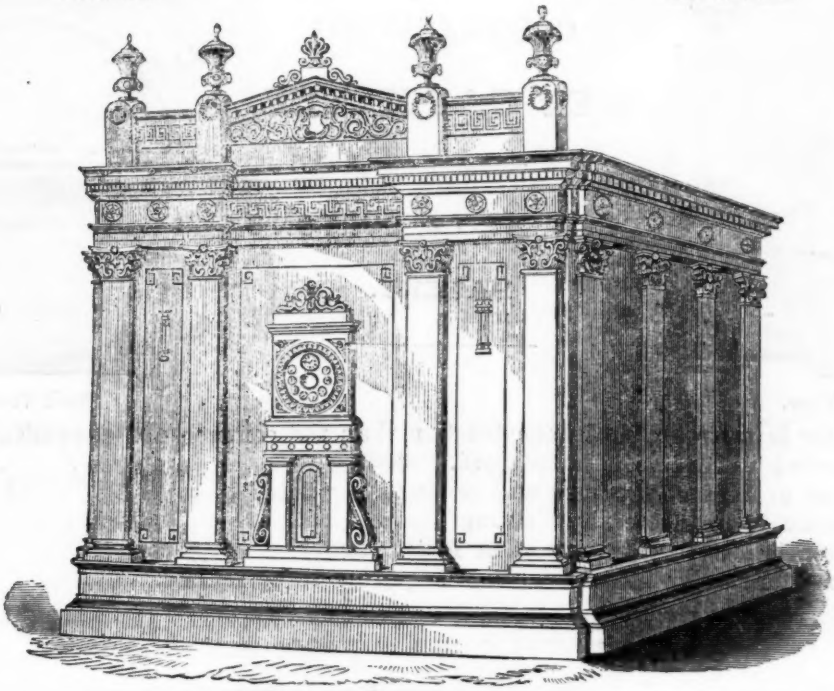
Sole Manufacturers of ESSON'S PATENT COMPENSATING GAS-METER,

AND OF **COWAN'S PATENT SIDE-VALVE GAS-METER.**

AGENTS.

Messrs. J. EDMUNDSON & Co., 36, Capel Street, DUBLIN.

Messrs. R. MITCHELL & Co., Peter Street and Craig Street, MONTREAL.



W. & B. COWAN'S SQUARE STATION-METER with PLANED JOINTS.

GOVERNORS, PRESSURE REGISTERS, TEST GASHOLDERS, GAUGES, &c.
WET AND DRY METERS SPECIALLY MANUFACTURED FOR STREET-LAMPS.

PRICE LISTS ON APPLICATION.

ADDISON POTTER
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire-Bricks and every description of Fire-Clay Goods.

BRONNER'S PATENT GAS-BURNERS
give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.
HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

B. CARPENTER'S
IMPROVED WOOD SIEVES
FOR
GAS PURIFIERS & SCRUBBERS.
WORKS:
22, HERMES STREET, PENTONVILLE ROAD.
LONDON, N.

The above Sieves are used by all the Gas Companies in London and a great many in the country. Their utility, durability, and cheapness combined, render them superior to all others.
Testimonials from Gas Engineers who have tested their qualities forwarded on application.
All orders punctually attended to, and estimates given if required.

CLAYTON'S PATENT SIX-WAY
VALVE only requires one valve to work two purifiers; saves more than three-fourths of the connexion-pipes; requires neither tees, elbows, nor bends; no racks or springs to get out of order.
For particulars, apply to CLAYTON, SON, & Co., Gas Engineers, Hunslet, LEEDS.

TO GAS COMPANIES, ENGINEERS, &c.
WOOD SIEVES.—WOOD SIEVES.
Estimates given and Contracts taken by the Manufacturer
GEORGE MACKANESS,
36, EDWARD STREET, HAMPSTEAD ROAD,
LONDON, N.W.
These Sieves are made with parallel or bevel bar, and guaranteed to be well seasoned yellow deal, and not common spruce so generally used.
N.B.—Specimens sent free on application.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.
N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

ALEXANDER F. PAINTER,
CONTRACTING ENGINEER
FOR
GAS & WATER WORKS,
GREAT BERKHAMPSTEAD, HERTS.
Foreign Orders carefully executed. Provincial Gas-Works designed and erected. Extensions of Works carried out with despatch. Mains supplied and promptly laid. Public and Private Buildings fitted up. Gasholders, Purifier Covers, and all Sheet Ironwork. Wrought Ironwork to drawing.
Specifications, Estimates, and Tenders given.
GAS-WORKS LEASED.

THE IMPERIAL METER COMPANY, LIMITED,

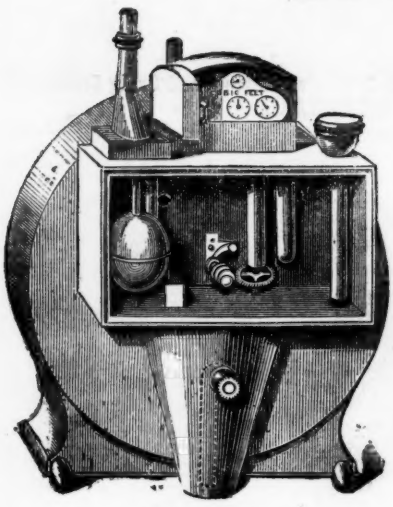
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

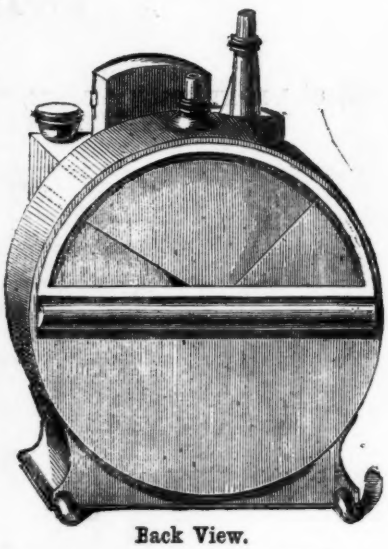
IMPERIAL

COMPENSATING

WET GAS-METER.

DE CASTRO & BURTON'S

PATENT.



Back View.

I. **This Meter is more simple in construction than the common non-compensating Meter.**
II. **An unvarying water-line is maintained.**
III. **No amount or kind of pressure will cause it to "flood."**
IV. **It is practically unaffected by "tilting."**
V. **The friction is less than in any other Meter; and**
VI. **It will last for twelve months without requiring to be refilled.**

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE COMMON NON-COMPENSATING WET GAS-METERS OF ALL SIZES, BOTH IN TIN AND CAST-IRON CASES.

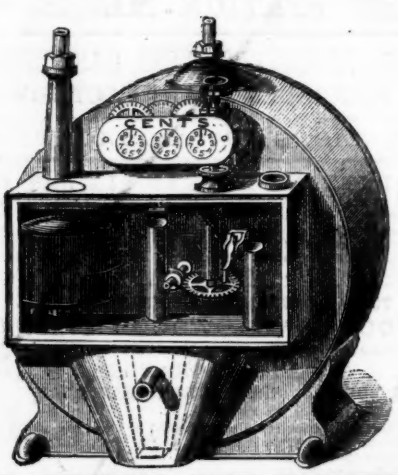
THE COMPENSATING

WET GAS-METER

IS UPHELD FOR

TEN YEARS

WITHOUT CHARGE.



THE IMPERIAL WET GAS-METER.
Non-Compensator.

STATION-METERS

WITH PLANED JOINTS,

AND

GOVERNORS,

MADE TO ORDER.

Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

THE IMPERIAL METER COMPANY, LIMITED,

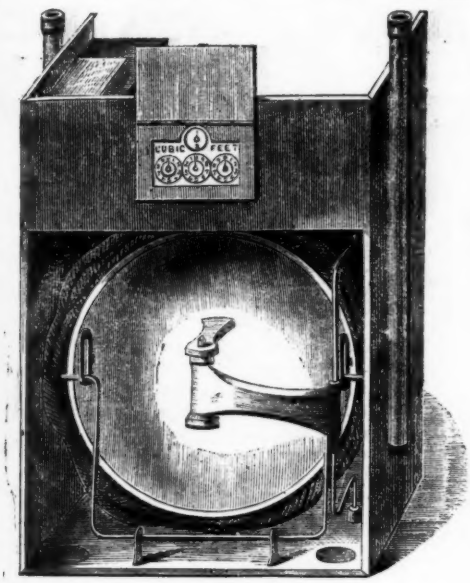
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

IMPERIAL

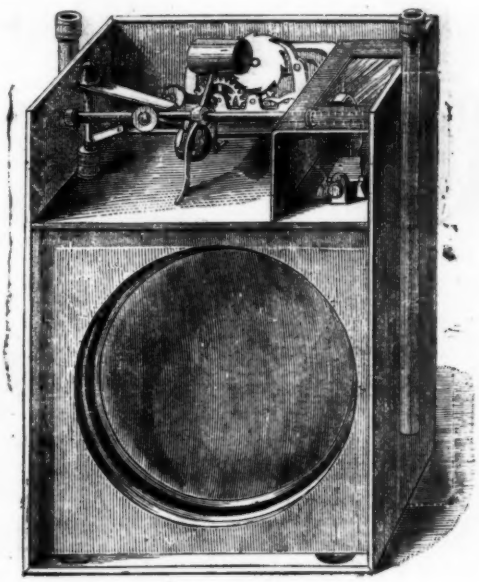
DRY

GAS-METER

SINGLE DIAPHRAGM.

TELLING & JOHNSON'S

PATENT.



Back View.

I. The mechanical construction of this Meter is simpler and stronger than any other.
II. About half as much leather is used as in ordinary dry Meters.
III. The Meter has only one valve, and this cannot "stick."
IV. The lights maintain perfect steadiness and strength of flame. There is no "draw."
V. The gas consumed can only be measured from the inlet to the outlet, and
VI. The index cannot be made to register backwards.

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE ORDINARY DOUBLE DIAPHRAGM DRY GAS-METERS OF ALL SIZES, BOTH IN TIN AND IN CAST-IRON CASES.

SPECIAL ATTENTION

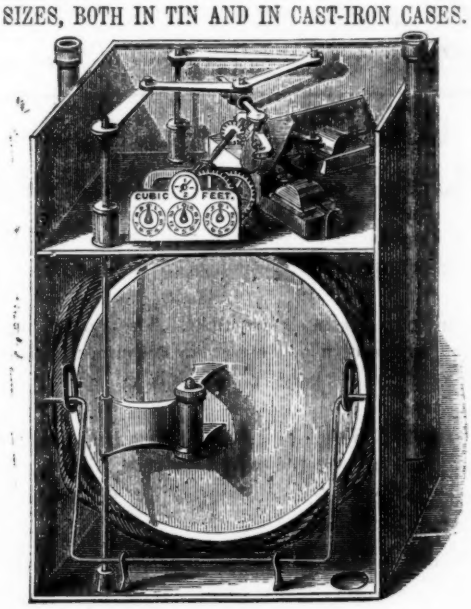
IS PAID TO THE

MANUFACTURE OF

STREET-LAMPS

AND

REGULATORS.



EVERY

DRY GAS-METER

IS UPHELD FOR

SIX YEARS

WITHOUT CHARGE.

THE IMPERIAL DRY GAS-METER.
Double Diaphragm.

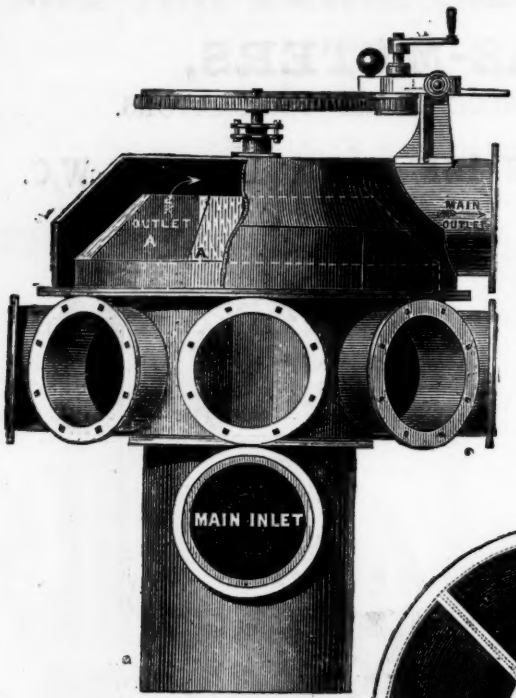
Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

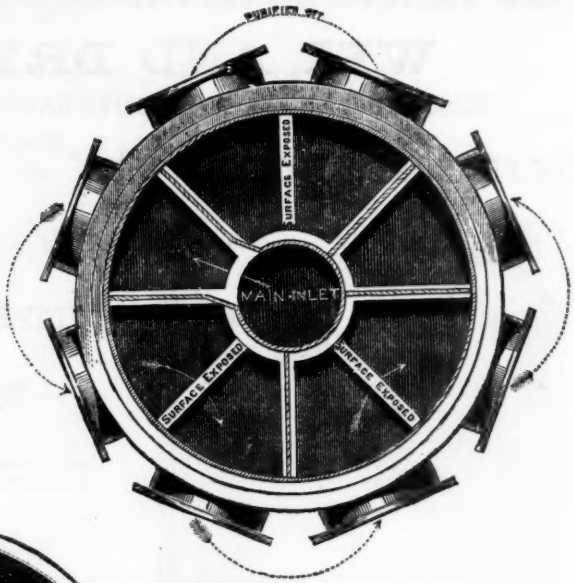
W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

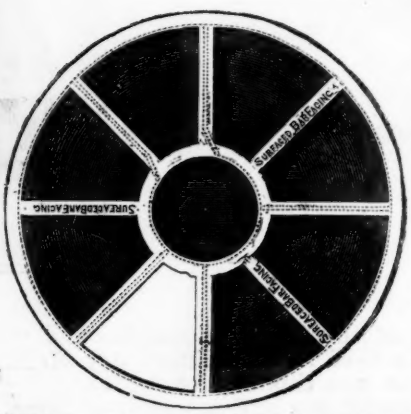
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.



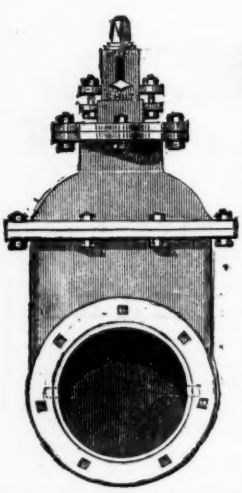
Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



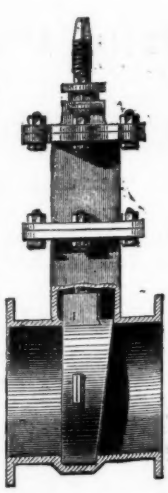
Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.



C. & W. WALKERS'
DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are superseding the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

GASHOLDERS, TELESCOPE & SINGLE-LIFT, of LARGEST DIMENSIONS.
PURIFIERS, SCRUBBERS, CONDENSERS of most Improved Description.
WOOD SIEVES FOR PURIFIERS,

Which have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

SCHOLL'S

PATENT PLATINUM

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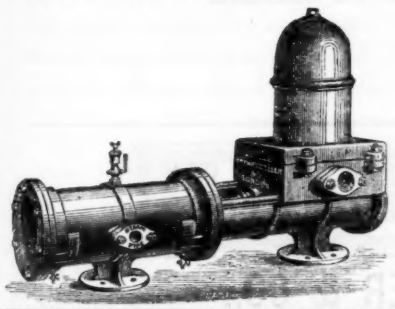

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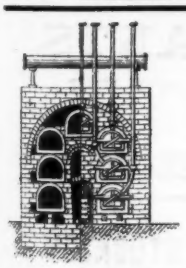

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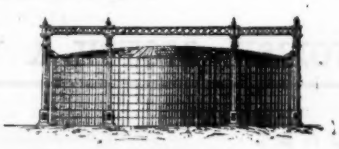

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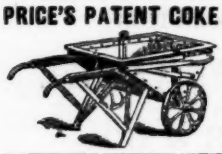
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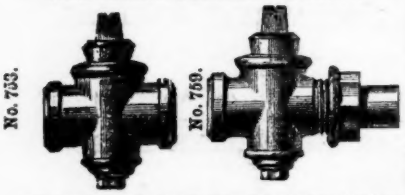

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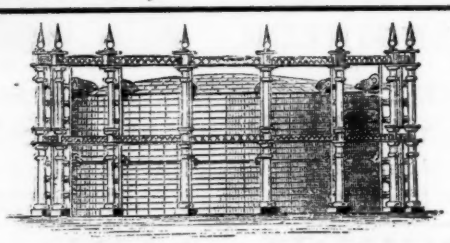
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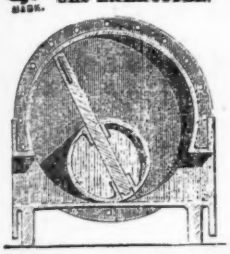

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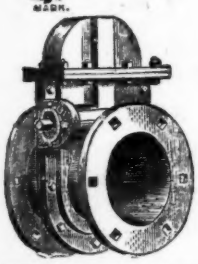

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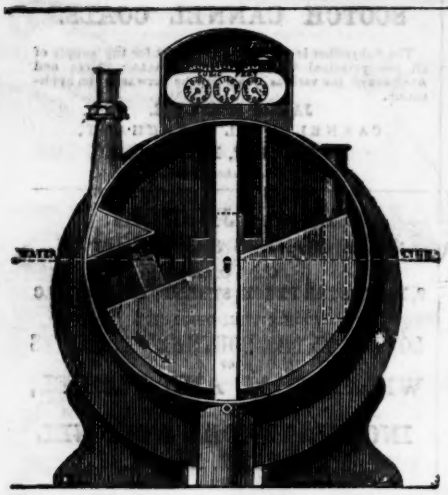

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